UNIVERSITY OF MALAYA

ELECTRONIC MARKETING

SESSION 2001/2002
WXES 3182 PROJEK ILMIAH TAHAP AKHIR II
CHOO SIN YONG
WEK 990039

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DATE OF SUBMISSION: 25 JANUARY 2001

Abstract

In the world of twenty-first-century business, enterprise resource planning (ERP) and Internet technologies are rapidly coming together. ERP software is used to share accurate information with trading partners. Meanwhile, Internet help to connect people, streamline processes and help reduce costs. Easy-to-use, web-based business environments help companies get to the point, and focus on what they do best.

Integrated Business Solutions (IBS) developed under ERP concept, which enables the company for managing their daily business processes systematically. IBS consists eight modules that meet the needs of customers, suppliers, partners and employees. The eight modules are E-Human Resource, E-Supplier, E-Banking, E-Sales, E-Marketing, E-Inventory, E-Account and E-Office. Each module plays the important role in this ERP project.

E-Marketing system is a web-based product information system. It serves as a centralized portal for people to look for product related information. This system is accommodating to users from different levels. E-Marketing system contains two sub-modules; that are consumer module and personnel module. Using different login identity, users will be accessing to either consumer's function and interface or personnel's function and interface.

For the consumer module, users can get the related product information they want and give their feedback and personal information to company. For the personnel module, it provides the template for maintain the online catalog and also generating the consumer info and reports.

Waterfall methodology has been chosen as the system development methodology for E-Marketing system. Meanwhile, the development tools for this system are Active Server Pages, Microsoft Visual InterDev 6.0, HTML, VBScript, JavaScript and Microsoft SQL Server 7.0. Windows 2000 chosen as the platform for this system, indirectly Internet Information Server become the web server during the development.

Acknowledgement

The success completion of this project is related to the contributions of many people. I would like to take this opportunity to thank some of the key people now.

First of all, I would like to thank Puan Norizan Mohd. Yasin, my supervisor for giving me this opportunity to develop this project. Secondly, I would like to thank her for her constructive advice, generous guidance, encouragement, support, dedication and supervision along the progress of this project. Her diligence and kindness in helping me throughout the project is deeply appreciated.

I also would like to acknowledge Puan Fariza Hanum Md. Nasaruddin, as the project moderator who contributed comments, suggestions and ideas to further enhance value of this project.

I want to express my gratitude to the IBS group members too, they are Ms Wee Siew Ying, Ms Chong Wan Sian, Mr. Kuan Kian Keong, Ms. Lim Mun Ching, Ms. Chin Hui Mei, Ms Kow Huey Ping and Ms. Yeap Hui Peng who have helped me and give me support and assistance to me throughout the project.

Lastly, the appreciation is also dedicated the others who have giving me valuable supports and encouragements and provide important information for the project.

Thank you very much!

Table of Contents **Page**

Table of Contents **Page**

Table of Contents **Page**

Table of Contents **Page**

Table of Contents **Page**

List Of Figures **Page**

List Of Figures **Page**

List Of Tables **Page**

CHAPTER ONE

Introduction

Chapter 1 Introduction

1.1 Project Background

For decades, management theorists have believed that companies could and should forge tighter links up and down the supply chains, from raw materials to customers. Since the late 1990s, companies have increasing turned to Internet- and Web-based technologies to accomplish this. But what they are finding is that without enterprise resource planning (ERP) software, sharing accurate information with their trading partners is impossible.

What companies coming to realize through their work with clients is the properly implementing e-business and ERP technologies in harmony truly creates a situation where one plus one equals more than two. Web-based technology puts life and breath into ERP technology that is large, technologically cumbersome, and does not always easily reveal its value. At the same time, ERP allows e-business to come into full flower, putting real substance behind that flashy Web page. While ERP organizes information within the enterprise, e-business disseminates that information far and wide. In short, ERP and e-business technologies supercharge each other.

ERP is the internal technological hub of a single enterprise. Web-based technology extends each enterprise's internal information infrastructure into the external environment, representing the company brand and projecting it to the marketplace. ERP is focused on the internal process efficiency and effectiveness. E-business is focused on external, cross-enterprise process efficiency and effectiveness and on product promotion. While ERP technology supports current business strategy, e-business opens the door to new strategic opportunities. To marry ERP and Web-based technology successfully and push each to achieve its maximum benefit, the providers of each must understand the benefits that each provides to the other.

ERP provides a company the flexibility required to improve customer responsiveness (the demand side) and to better manage production needs and inventory (the supply side). It is also the ultimate tool for effective allocations of a business's scarce resources. With ERP, a company can create a new information foundation by replacing many legacy systems of varying vintages that house data in different ways. Senior management can use ERP to gain control over information and improve decision support. ERP also provides a consistency of information across a global enterprise and integrates the following:

- Resource planning, which includes forecasting and planning, purchasing and material management, warehouse and distribution management, product distribution, and accounting and finance.

- Supply-chain management, which includes understanding demand and capacity, and scheduling capacity to meet demand. This reduces cycle time and inventory levels and improves a company's cash position.

- Demand chain management, which includes handling product configuration; quotes, pricing, and contracts; promotion; and commissions.

- Knowledge management, which includes creating a data warehouse, a central repository for the enterprise's data; performing business analysis on this data; providing decision support for enterprise leadership; and creating future customer-based strategies.

This project is develop under the ERP concept which we integrate the business activities of front office and back office and then bring it online. We have divided into a few modules. Those are E-Office, E-Human Resource, E-Accounting, E-Inventory, E-Marketing, E-Sales, E-Supplier and E-Banking.

- E-Office

  Responsibility in managing the access controls which different identities such as the unauthorized user and the administrator. Also generating general reports for executive's level.

- E-Human Resource

  Responsibility in hiring the employee, managing the employees' information and process of the salary payment.

- E-Accounting

  Responsibility in doing the money transaction, general ledger, order entry, fixed assets and others account in the company.

- E-Inventory

  Responsibility in controlling the transaction of the purchasing products with the salesmen and the supplier.

- E-Marketing

  Responsibility in doing the online advertising and promotion activities, market survey and maintain communication between company and consumers.

- E-Sales

  Responsibility in doing the transaction of the process selling online with the consumers.

- E-Supplier

  Responsibility in managing the relationship with the inventory department in process of transaction selling online.

- E-Banking

  Responsibility in doing the payment transaction online.

Nowadays, huge enterprise is being created using electronic commerce; the practice of satisfying consumer and business wants and needs through online procurement. Facilitating electronic commerce is the process of electronic marketing, which have been greatly enhanced by online technology. In recent years, an electronic communications and information medium called the Internet has spawned software and hardware innovations designed specially to aid the convenience of online shopping.

Collectively with the Internet, electronic marketing resources such as online customer research, e-mail, Web sites, intelligent shopping agents, self-identifying online surveys, and online customer service among others electronic tools are being integrated into traditional marketing programs, improving reach, effectiveness, and efficiency of contact to targeted audiences. Web sites offer a previously unavailable combination of graphics, color, motion, sound, and virtual reality environments to support customer interactivity. This novel interactivity, a two-way communication between the marketer and the customer, adds speed and accessibility to e-commerce transactions.

Electronic marketing is a high-tech, strategic and tactical extension of information gathering, direct marketing, and customer feedback, all-important activities of the Integrated Marketing Communications (IMC) program. Therefore, in perspective, the process of electronic marketing, augmented in many communication, transaction, and decision areas by electronic marketing resources that smooth the path to successful and timely electronic commerce.

Electronic marketing knowledge is critical for those who hold the following position in big firms: CEO, CFO, VP of marketing, director of sales, advertising manger, direct marketing manager, head of PR, promotion manager, market research manager, telemarketing manager, product brand and category manager.

Electronic marketing know-how is now vital for any new college graduate, even an MBA who is marketing-oriented, computer-trained, and innovative. But any trainee concerned with marketing, sales, advertising, display promotion, PR, research, or services, will advance more quickly by demonstrating an understanding of electronic marketing. In addition, electronic marketing can be a lifesaver for career changers seeking a growth field in marketing.

1.2 Project Aims

The Electronic Marketing is designed with aims such as distribute the resources of products and services in the form of electronic data, which can be easily distributed over the Web. This can ensure the flexibility and for the user's conveniences.

A wider range of choices for products and services, which may satisfy with consumers' needs, will be provided through the Web. Consumers from all corners will be able to find information and guidance they want about the products and services through the Electronic Marketing on anytime and anywhere.

1.3 Project Objectives

The objective of this project is to create a web-based Electronic Marketing, which build using the Enterprise Resource Planning (ERP) concept, due to improve operational effective and efficiency.

Objectives of the development of the Electronic Marketing:

- **To provide a user-friendly, accessibility and ease of use graphical user interface.**
  The design of UI is visually pleasing and easy to navigate, which can accommodate all levels of users. No command or programming skill is needed to access the system. Users can handle the system very easily as simple as clicking on buttons by using the mouse only. Users do not have to do a lot of typing; data input is decreased to the minimum. Most of the data are retrieved from the database.

- **To provide a real time accessible system**
  Internet commerce sites will often need to mirror and use data from companies' existing business processes. This system will integrate the existing business processes and ensure the most reliable and the latest information is distributed in the network.
  Once the database is updated, all the info in the system, as can be seen in the web page, will also be updated automatically. The latest news can be reached to everyone in the company.

- **To provide a paperless environment to manage business processes**
  The system that is being developed is a web-based system. So, the system use of electronic data transmission to implement or enhance any business process and Internet or Web as its data transmission medium. No paper is needed; all data is stored and retrieve from database.

- **To create a dynamic and promotional online catalog.**
  Businesses that sell product or services need to manage catalogs that display product and services offerings to customers in a clear, compelling, searchable fashion. In a consumer's environment, such content needs to be highly promotional, supporting price and product promotions. Consumers can find the products or services that will satisfy their needs 24 hours a day.

- **To create an email feature for promoting products and services**

  Consumers can recommend or sharing their favorite products or services by email directly to their friend through the email feature in the commerce site. So, businesses can be promoted to the potential consumers in every country in the world.

- **To create a template for personnel to construct and maintain the online catalog easily.**

  All generated catalogs can be edited or removed from the commerce sites. The new product can be added into product pool from where the products are selected to put into the catalog. The basic properties like product code, product name, product description; pricing and picture for the product can be defined.

1.4 Project Scopes

Integrated Business Solution is an online solution specially designs for small and medium enterprises. It delivers comprehensive, proven and flexible solutions enabling e-Business across the enterprise - from front office operations like sales automation, marketing, service and support, to back office operations including accounting, inventory control, administration and human resource activities and relationship between suppliers and bank.

This project is divided into two major modules. There are **consumer module** and the **personnel module**. The user module will be accessible to the user or consumers from all the levels. However, only authorized user, such as advertising manger, direct marketing manager, promotion manager, market research manager and so on can access the administration module.

Consumer module:

The consumer module provides the following capability:

- Provide categorized and easy to find online promotion products or items.
- Provide detailed information about the products or items including the description and price will be shown in the attractive screen displays.
- Provide features to let consumers adding the product or item to the shopping cart after they decided to buy it.
- Provide features that allow consumers to recommend the product or item to their friends who may be interested in that product or item through email.
- Provide features, which can let consumers rating the product, or item to show how much they are satisfy with the product or item.
- Provide features, which can collect consumers' information for retailer's convenience to sending email when there are new products launched.

Personnel Module:

The personnel module provides the following capability:

- Provide the feature to let personnel doing maintenance for the Web page.
- Provide the feature to let personnel edit the design of the top banner, which are, consists the company logo and company name.
- Provide the feature to let personnel adding, editing, and deleting the product or item in the online catalog.
- Provide the feature for upload, review and remove the product's images in the folder.
- Provide the feature that personnel can view or check which product is more popularity.
- Provide the feature to let personnel generating the daily sales report.

- Provide the feature to let personnel generating the consumers' information included their favorite area, email address and so on.

1.5 Project Limitation

The limitations of this project are shown as below:

- This project only supports single communication language, which is English.
- There is no currency conversion service in this project.
- There is no linking to the website that related to the product in this project.
- There only provides one type of layout in the template for maintain the main body of the web page.
- There is no template built for maintain the left navigation and footer of the web page.
- SQL server, web server and Windows 2000 server will perform into a same pc.

1.6 Project Significances

This project dramatically simplifies the process of organizing and managing online commerce campaign. These include product launch / announcement, sales promotion, market survey, online advertising campaign and maintain public relation communication. Electronic Marketing is important in such a developed world now. Here are some reasons on why is it significant.

- Electronic Marketing enables retailers to do the advertising and promotion activities to communicate information and details about their new products and services to existing and potential customers.

- Electronic Marketing enables more buyers to work at home through Internet. So they will do less traveling for searching the products and services, which can fulfill their needs. As a result, it will bring less traffic on the roads and lower air pollution.

1.7 System Requirements

The system requirement of the Electronic Marketing System is divided into two parts, hardware requirement and software requirement.

The hardware requirements for developing Electronic Marketing are:

- Intel Pentium 166 MHz and above
- 64 MB RAM and above
- 2 GB hard disk with a minimum of 650MB of free space PS/2 Keyboard (else a converter is required)

The software requirements for developing Electronic Marketing are:

- Windows 2000
- Internet Information Server
- Active Server Pages (ASP)
- Microsoft Visual Interdev 6.0
- Visual Basic Script
- Java Script
- Microsoft SQL Server 7.0

1.8 Project Development Strategy

Many process models are described in the software engineering literature. Some are prescription for the way software development should progress, and some are description of the way software development is done in actually. In theory, the two kinds of models should be similar or the same, but in practice, they are not.

This project was developed based on waterfall model. This is the first explicit model of software development process that was derived from other engineering process. It characterizes a series of software engineering stages. The waterfall model is shown in Figure 1.1

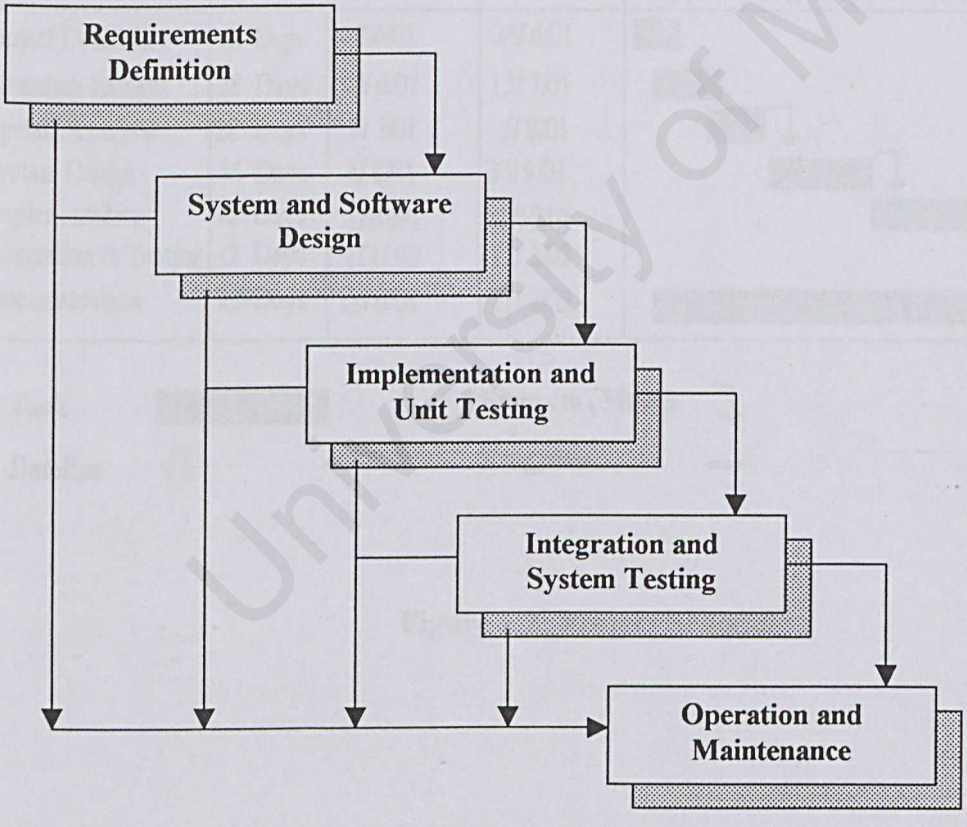


Figure 1.1 Waterfall Model

This approach takes all the software development activities and represents them in separate processes. These phases include requirement defining system and software design, implementation and unit testing, integration and system testing, and operational and maintenance. The development process goes from one stage to another.

1.9 Project Schedule

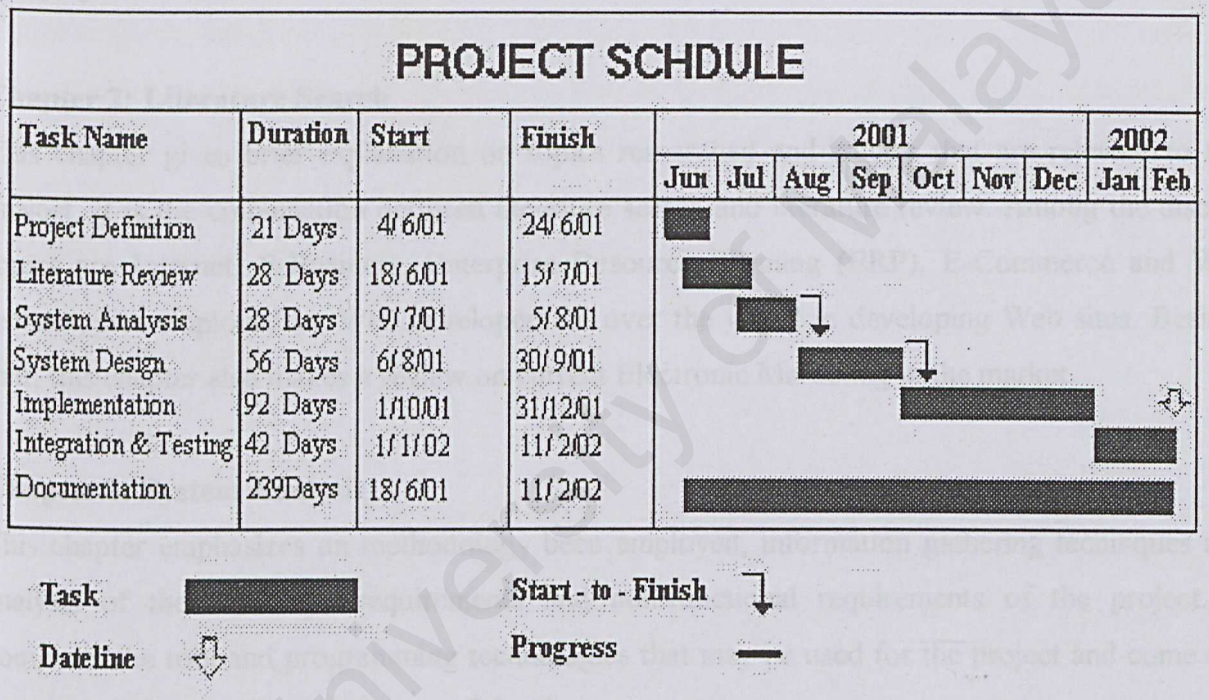


Figure 1.2: Project Schedule

1.10 Report Layout

The purpose of this layout is to give an overview of the major phases involved during development of the project. Below is the report layout:

Chapter 1: Introduction

This chapter gives a brief introduction about this project, as well as the objective, scope and the importance of this project. It also mentions the system requirement, project development strategy and project schedule.

Chapter 2: Literature Search

This chapter gives brief explanation on topics researched and studies that are relevant to this project. It is the combination between literature search and literature review. Among the discuss topics are Internet, E-Business, Enterprise Resource Planning (ERP), E-Commerce and Web technologies employed by Web developers all over the world in developing Web sites. Besides that, this chapter also makes a review on current Electronic Marketing in the market.

Chapter 3: System Analysis

This chapter emphasizes on methodology been employed, information gathering techniques and analysis of the functional requirements and non-functional requirements of the project. It compares the tool and programming technologies that may be used for the project and come out the results of the analysis at the end of the chapter.

Chapter 4: System Design

This chapter explains the conceptual and technical design of the system. It covers the structure chart, content design, data flow diagram, database design and user interface design.

Chapter 5: System Implementation

This chapter, deemed to be one of the most important sections of this report, illustrates how the suggested programming technology and development tools were used in the development of the system. It is a close representation of the actual work done on the system.

Chapter 6: Testing

This chapter notes down the tests carried out on the system as well as the level of testing employed during the development of the system.

Chapter 7: System Evaluation

This chapter lists out all the project findings, such as problem encountered and solution, system strengths, system constraints and limitations, future enhancements and knowledge and experience gained during the development of this project. Finally, an overall conclusion is presented at the end of this chapter.

1.11 Summary

Electronic Marketing is an improvement to the existing traditional commerce in the market. This chapter has been clearly clarified the objectives, scope, system requirement, development strategy and schedule of this project.

CHAPTER TWO

Literature Review

Chapter 2 Literature Review

2.1 Fact Finding Techniques

Fact-finding is needed in order to have a better understanding of the system's needs and requirements. There are many sources that provide information in my research. The information gathering techniques involved are:

- **Internet Research**
  Internet is used as the main resource for referring any ambiguities that arise during the entire development period. By analyzing in the similar system has made a big help in giving ideas on the features, functionality as well as the design of the web-based system. Besides that, online tutorials regarding programming language can also be obtained through surfing the Internet.

- **Document Room**
  Previous seniors' thesis have been read through in order to gain an overall understanding on how a system was developed, what were the functional and non-functional requirements, and other related data. The general structure of each thesis has also been observed to find out the steps taken in carrying out a thesis.

- **Library**
  Books, journals and magazines from the library have been read through and valuable information has been noted down.

- **Bookstores**
  Several renowned bookstores, such as MPH and Popular, contain relevant references about this project. Suitable references books have been purchased in order to learn in detail about the technologies used in this project.

- **Newspaper And Magazines**

  Articles from daily newspapers about the related field of study for this project have been collected for future references. Much useful information has been found from PC Magazine that provides me with the latest technology in Information Technology and computing fields

- **Software Testing**

  Relevant software and web development tools have been tested out to evaluate their suitability for this project.

2.2 Internet

The name "Internet" is derived from the concept of "internetworking"; that is, connecting host computers and their networks to form an even larger, global network. And that is essentially what the Internet is: a large world –wide network of networks that use a common protocol to communicate with each other. The interconnected networks include UNIX, VAX, IBM, Novell, Apple and many other network and computer types. The Internet stands as the most prominent representation of global networking. The networks that make up the Internet are each developed and maintained by different organizations, ranging from government agencies, to educational institutions, to private businesses, and to large commercial services such as American Online (AOL) and CompuServe. No single person or organization, therefore, owns or maintains the Internet. [1]

2.2.1 History Of Internet

The Internet had its roots during the 1960's as a project of the United States government's Department of Defense, to create a non-centralized network designed to survive partial outages (i.e. nuclear war) and still function when parts of the network were down or destroyed. This project was called ARPANET (Advanced Research Projects Agency Network), created by the Pentagon's Advanced Research Projects Agency established in 1969 to provide a secure and survivable communications network for organizations engaged in defense-related research.

In order to make the network more global a new sophisticated and standard protocol was needed. They developed IP (Internet Protocol) technology, which defined how electronic messages were packaged, addressed, and sent over the network. The standard protocol was invented in 1977 and was called TCP/IP (Transmission Control Protocol/Internet Protocol). TCP/IP allowed users to link various branches of other complex networks directly to the ARPANet, which soon came to be called the Internet.

Researchers and academics in other fields began to make use of the network, and eventually the National Science Foundation (NSF), which had created a similar and parallel network called NSFNet, took over much of the TCP/IP technology from ARPANET and established a distributed network of networks capable of handling far greater traffic.

ARPANet grew during the 1970's, and was upgraded to a high-speed network by linking several powerful supercomputer stations called nodes.

In 1985, the National Science Foundation (NSF) began a program to establish Internet access across the United States. They created a backbone called the NSFNet and opened their doors to all educational facilities, academic researchers, government agencies, and international research organizations. ARPANet was shut down by the Defense Communications Agency in 1989 due to limited funding and support from the military.

By the 1990's the Internet experienced explosive growth. It is estimated that the number of computers connected to the Internet was doubling every year. By mid-1994 the Internet connected an estimated two million computers in more than 100 countries, serving some 23 million users. Many commercial computer network and data services also provided at least indirect connection to the Internet. It was also estimated that at this rapid growth everyone in the world would have an e-mail address by the year 2000. [16]

2.2.2 What We Will Find On The Internet ?

We encounter information and people on the Internet. In terms of information, the Internet enables companies, groups, institutions, and individuals to share a wide range of data, including text, audio, graphics, databases, and other media types. The scientific and academic communities have used it for many years for information sharing and research. Recently, the largest growth segment of the Internet has been the business sector. Business are using the Internet for commercial purposes such as electronic commerce and marketing, global communications, customer feedback and support, and corporate logistics. For users, the Internet also provides a wealth of technical information, databases, and software services. But the Internet is more than data and information. It enables us to be in contact with people from all over the globe. Tools such as electronic mail and newsgroups assist us in communicating with other people that we may or may not know personally. In the last couple of years, there have been substantial changes in the scope of services and facilities available through the Internet. For example, recent advancements in communication technologies and increasingly high transmission speeds have made interactivity – real time collaboration between people – possible over the Internet. [2], [17]

2.2.3 What Internet Does For Business ?

Nowadays, Internet really plays an very important role for business management. There are: [3]

- **Creating a client base**

  The Internet is a ready base of several million people from all walks of life. One can easily find new clients or customers from this massive group given that their presence on the Internet is known.

- **Product analysis**

  Company can do the product analysis and comparisons on the Internet. They can easily find out one other person who may be familiar with a product that is currently tested or about to purchase.

- **Market analysis**

  The large base of Internet, users is a prime area for the distribution of surveys for an analysis of the market for a new product or service idea. These surveys can reach a great many people with little effort on the part of the surveyors.

- **Expert advice and help**

  Beyond product analysis, there are also a great many experts on the Internet who make their presence widely known and easily accessible. Very often the online company can get free advice and help with problems it might have from the same people who are paid highly for their consulting services to large organizations.

- **Recruit new employees**

  Internet has many job lists and resume online for employers. New resumes are constantly posted to inform the availability of new skills.

- **Rapid information access**

  Accessing information over the Internet is much faster on most occasions than transmission and transfer via fax or postal courier services. It is easier to access and get the information from countries around the world and make interactive connections to remote computer systems.

2.3 World Wide Web

In the spring of 1989, at CERN (the European Laboratory for Particle Physics), Tim Berners-Lee proposed the idea of a distributed hypermedia technology to facilitate the international exchange of research findings using the Internet. Almost exactly two years later a prototype World Wide Web (WWW or the Web in short) was developed at CERN. The release in 1993 of Mosaic, the first graphical user interface to the Web, marked the beginning of a sustained exponential growth in the number of Web sites and the amount of Web traffic. This explosive growth is the prime cause for the widespread use of Internet and the intense business interest in exploiting the Internet.

A technical definition of the World Wide Web is: all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).

A broader definition comes from the organization that Web inventor Tim Berners-Lee helped found, the World Wide Web Consortium (W3C): "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge."

The Web is, in essence, an architecture for sharing information. The information is in the form of linked pages that reside at various sites around the Internet.

The Web also is a system consisting of an internationally distributed collection of multimedia files supported by clients (users) and servers (information providers). Each file is addressed in a consistent manner using its uniform resource locator (URL). The clients using browsers such as Mosaic, Netscape Navigator, or Microsoft's Internet Explorer view the files from the providers. Most common browsers have graphical display and support multimedia: text, audio, image, and video. The user can move from file to file by clicking with a mouse or other pointing device on specially highlighted text or image elements on the browser display; the transfer from one file to the next is called a hyperlink. The layout of the browser display is controlled by the Hypertext Markup Language (HTML) standard, which defines embedded commands in the text files which specify features of the browser display, such as the fonts, colors, images, and their placement on the display, and the location of the locations where the user can invoke the hyperlinks and their targets. The last important feature of the Web is the hypertext transfer protocol (HTTP), which is a communications protocol for use in TCP/IP networks for fetching the files from the appropriate servers as specified by the hyperlinks. [18], [19]

2.3.1 Uniform Resource Locator

A URL (Uniform Resource Locator) is a compact representation of the location and access method for a resource available via the Internet. URLs are used to locate resources, by providing an abstract identification of the resource location. Having located a resource, a system may perform a variety of operations on the resource, as might be characterized by such words as access, update, replace, find attributes,. In general, only the access method needs to be specified for any URL scheme.

The type of resource also depends on the Internet application protocol. Using the World Wide Web's protocol, the Hypertext Transfer Protocol (HTTP) , the resource can be an HTML page, an image file, a program such as a common gateway interface application or Java applet, or

any other file supported by HTTP. The URL contains the name of the protocol required to access the resource, a domain name that identifies a specific computer on the Internet, and a hierarchical description of a file location on the computer. [2]

2.3.2 Hypertext Markup Language

HTML (Hypertext Markup Language) is the set of markup symbols or codes inserted in a file intended for display on a World Wide Web browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Because HTML documents are text-based, they are very flexible and can be displayed on a variety of platforms, as long as the platform has a browser that understands the language. Each individual markup code is referred to as an element (but many people also refer to it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end. HTML is a non-proprietary format, based upon SGML, for describing the structure of hypermedia documents - plain text (ASCII) files with embedded codes for logical markup, using tags like <A> and </A> to structure text into tables, hypertext links interactive forms, headings, paragraphs, lists, and more. It can be created and processed in a wide range of tools from simple plain text editors to sophisticated WYSIWYG (What You See Is What You Get) authoring tools.

HTML is a formal Recommendation by the World Wide Web Consortium (W3C) and is generally adhered to by the major browsers, Microsoft's Internet Explorer and Netscape's Navigator, which also provide some additional non-standard codes. The current version of HTML is HTML 4.0. However, both Internet Explorer and Netscape implement some features differently and provide non-standard extensions. Web developers using the more advanced features of HTML 4 may have to design pages for both browsers and send out the appropriate version to a user. Significant features in HTML 4 are sometimes described in general as dynamic HTML. What is sometimes referred to as HTML 5 is an extensible form of HTML called Extensible Hypertext Markup Language (XHTML). [20], [21]

2.3.3 Hypertext Transfer Protocol

The Hypertext Transfer Protocol (HTTP) is the set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web and can be used in any client-server application involving hypertext. Relative to the TCP/IP suite of protocols (which are the basis for information exchange on the Internet), HTTP is an application protocol. Sometimes, HTTP is also define as a transaction-oriented client-server protocol. The most typical use of HTTP is between a Web browser and a Web server.

Essential concepts that are part of HTTP include (as its name implies) the idea that files can contain references to other files whose selection will elicit additional transfer requests. Any Web server machine contains, in addition to the HTML and other files it can serve, an HTTP daemon, a program that is designed to wait for HTTP requests and handle them when they arrive. Your Web browser is an HTTP client, sending requests to server machines. When the browser user enters file requests by either "opening" a Web file (typing in a Uniform Resource Locator) or clicking on a hypertext link, the browser builds an HTTP request and sends it to the Internet Protocol address indicated by the URL. The HTTP daemon in the destination server machine receives the request and, after any necessary processing, the requested file is returned. [22], [23]

2.4 Intranet

An intranet is a private network that is contained within an enterprise. It may consist of many interlinked local area networks and also use leased lines in the wide area network. Typically, an intranet includes connections through one or more gateway computers to the outside Internet. The main purpose of an intranet is to share company information and computing resources among employees. An intranet can also be used to facilitate working in groups and for teleconferences.

An intranet uses TCP/IP, Hypertext Transfer Protocol, and other Internet protocols and in general looks like a private version of the Internet. With tunneling, companies can send private messages through the public network, using the public network with special encryption/decryption and other security safeguards to connect one part of their intranet to another.

Typically, larger enterprises allow users within their intranet to access the public Internet through firewall servers that have the ability to screen messages in both directions so that company security is maintained. When part of an intranet is made accessible to customers, partners, suppliers, or others outside the company, that part becomes part of an extranet.

Nowadays, intranets are popular for several reasons. First, an intranet gives a organization a relatively inexpensive, easy, quick international telecommunications infrastructure. It would cost far more, and take far longer, if a firm were develop a similar telecommunications infrastructure on their own, with dedicated phone lines rented from a telecommunications services provider. Second, intranets can help firm improve product and service quality while decreasing costs and the cycle time. Third, and perhaps most important, the use of an intranet helps an organization learn more about the Internet before interacting with "real" customers. Intranets are often a wise intermediate step in preparing for full-blown Electronic Commerce. [2], [3], [24]

2.5 Extranet

An extranet is a private network that uses the Internet protocol and the public telecommunication system to securely share part of a business's information or operations with suppliers, vendors, partners, customers, or other businesses. An extranet can be viewed as part of a company's intranet that is extended to users outside the company. It has also been described as a "state of mind" in which the Internet is perceived as a way to do business with other companies

as well as to sell products to customers. The same benefits that HTML, Hypertext Transfer Protocol (HTTP), Simple Mail Transfer Protocol (SMTP), and other Internet technologies have brought to the Internet and to corporate intranets now seem designed to accelerate business between businesses.

An extranet requires security and privacy. These require firewall server management, the issuance and use of digital certificate or similar means of user authentication, encryption of messages, and the use of virtual private networks (VPN) that tunnel through the public network.

Companies can use an extranet to:

- Exchange large volumes of data using Electronic Data Interchange (EDI)
- Share product catalogs exclusively with wholesalers or those "in the trade"
- Collaborate with other companies on joint development efforts
- Jointly develop and use training programs with other companies
- Provide or access services provided by one company to a group of other companies, such as an online banking application managed by one company on behalf of affiliated banks
- Share news of common interest exclusively with partner companies

So, by using the extranet, that enables benefit managers to access information on their desktop computers using a standard Web browser. In additional, the system is secure so that no authorized users can access plan information. In the past, a request for a custom report might have taken weeks to complete; the report needed to be created, printed, and then sent to the customer. Today, custom reports are just a click away. So that, the companies can save money by not having to create, print, and send reports. Likewise, companies can provide much faster responses to employee questions. Clearly, this extranet is providing a win-win solution for both companies and its customers.

Netscape, Oracle, and Sun Microsystems have announced an alliance to ensure that their extranet products can work together by standardizing on JavaScript and the Common Object

Request Broker Architecture (CORBA). Microsoft supports the Point-to-Point Tunneling Protocol (PPTP) and is working with American Express and other companies on an Open Buying on the Internet (OBI) standard. The Lotus Corporation is promoting its groupware product, Notes, as well suited for extranet use. [2], [3], [25]

2.6 What is Electronic Business?

E-Business is the complex fusion of business processes, enterprise applications and organizational structure necessary to create a high performance business model. It refers to the use of digital technologies to transform both the internal processes as well as an organization's interactions with external parties.

E-Business is what happens when you combine the resources of traditional information systems with the vast reach of the Web and connect critical business systems directly to critical business constituencies - customers, employees, partners and suppliers using Intranets, Extranets and the World Wide Web.

E-business can be divided into three main areas: It can be within the organization using the so-called Intranet. The Intranet uses Internet standards for electronic communication. People on the Intranet are able to see organization-specific web sites. These web sites are separated from the rest of the world by firewalls and other security measures. People from outside of the organization are not able to see these private pieces of information.

The second area is the business-to-business (B2B) deals that are done over the Extranet. The Extranet consists of two Intranets connected via the Internet, whereby two organizations are allowed to see confidential data of the other. Normally only small parts of information are made available to the partner, just enough to enable the business. Business-to-business networks have existed long before the Internet. Many organizations have had private networks to talk to their

partners and customers. But maintaining them was very expensive. Through the usage of the Internet the costs have been cut dramatically. In order to keep the business transactions private virtual private networks (VPNs) are used in most cases.

Thirdly there is the business-to-consumer (B2C) area. Traditionally this is what most people know as e-commerce, selling products on the web. Also to keep in mind is the consumer-to-consumer area, also known as peer-to-peer commerce, such as auction sites or digital exchanges like Napster.

No matter in which of the three areas a company wishes to do business, they must ask the right questions before going online. Just having a web page or the infrastructure for the Intranet, Extranet or Internet is no help. They need to decide on your target group and think hard about the processes that need to be done electronically. Technically there is no difference between the Intranet, the Extranet and the Internet. The Extranet and Intranet are subsets of the Internet, which can be viewed only by certain groups. [4], [26]

2.6.1 Why Electronic Business?

In a few short years, e-business has gone from concept to undeniable reality. For good reason. It works for everyone: consumers, businesses and governments. The primary values of e-business--cost savings, revenue growth, and customer satisfaction--are proving to be just the tip of the iceberg. Having realized the benefit of Web-enabling individual business processes, many companies are now seeking further ROI by integrating new and existing e-business applications and technologies (two billion Internet-ready devices like smart phones, PDAs and other pervasive computing applications are expected to be in consumers' hands in the next two years). These devices and applications are prime candidates to better serve customers and improve efficiency. The key to success is finding a way to give customers what they want without the expense of traditional business operations. [4]

2.6.2 Components Of Electronic Business

The following formula is simply a graphical representation of important e-business components.

EB = EC + BI + CRM + SCM + ERP

EB	=	Electronic Business
EC	=	Electronic Commerce
BI	=	Business Intelligence
CRM	=	Customer Relationship Management
SCM	=	Supply Chain Management
ERP	=	Enterprise Resource Planning

That is, e-business is e-commerce plus business intelligence, customer relationship management, supply chain management, and enterprise resource planning.

E-commerce uses digital technologies such as the Internet and bar code scanners to enable the buying and selling process. In other words, e-commerce is about transactions. E-commerce involves distribution channels and e-tailing. E-commerce and e-business are often used interchangeably; however, we'll treat e-commerce as a subset of e-business. The next four terms relate to the most important business processes supporting e-business.

Business intelligence refers to the gathering of secondary and primary information about competitors, markets, customers, and more. The Internet is especially good for business intelligence. In order to attract and retain your best customers, you need a precise portrait of which they are -- their wants, their needs, and their buying patterns. Business intelligence paints that picture by analyzing and interpreting vast quantities of data-customer demographics, product-purchase histories, cross-sales, service calls, Internet experiences and online transactions

-- turning information into insight and developing conclusive, fact-based strategies to gain that competitive edge.

Customer relationship management (CRM) involves retaining both business and individual customers through strategies that ensure their satisfaction with the firm and its products. CRM seeks to keep customers for a long time and to increase the number and change the timing of transactions they conduct with the firm. As it relates to e-business, CRM uses digital processes and integrates customer information collected at every customer "touch point". Customers interact with firms in person at retail stores or company offices, by mail, via telephone, or over the Internet. The results of interactions at all these touch points are integrated to build a complete picture of customer characteristics, behavior, and preferences. Entering information about these interactions into customer records held in database for all marketers to access is the stuff of CRM in the electronic environment.

Supply chain management happens behind the scenes. It involves coordination of the distribution channel to deliver products effectively and efficiently to customers. For example, when a user orders from particular Web sites, Federal Express computers receives the instruction to pick up product from a warehouse and get it to the customer fast. Similarly, when consumers buy a product at the grocery store, the product bar code scanner tells the computer to reduce the inventory count by one, and then automatically order one more cases of the product from warehouses or suppliers if inventory in the back room is low. These processes, called integrated logistics, are enhanced by computer systems.

Enterprise resource planning (ERP) also refers to back office operations such as order entry, purchasing, invoicing, and inventory control. ERP systems allow organizations to optimize business processes while lowering costs. Note that ERP system such as SAP/AG predates the Web. The same can be said for many of the other technologies just mentioned.

E-business applications manage supplier data, customer data, and all associated transactions. E-business improves business performance by using electronic information technologies and open standards to connect suppliers and customers at all steps along the value chain. E-business can significantly improve business performance by strengthening the linkages in the value chain between businesses, and between a business and the ultimate consumer. [5], [27]

2.7 What Is Enterprise Resource Planning?

Enterprise Resource Planning (ERP) could be described as the spinal cord of the digital nervous system, facilitating the exchange of data through the unification of key processes. It is an advanced core business IT system that integrates data across major functions and activities as well as across organizational, and geographical boundaries, providing a platform for increased business performance and competitive advantage. All the applications in an ERP suite share a common set of data that is stored in a central database. Nowadays the ERP phenomenon is not restricted to large firms. Smaller firms are slowly adopting ERP solutions as prices drop and larger manufacturers are beginning to demand that suppliers be ERP compliant. As a result, leading ERP vendors, such as SAP, Oracle, PeopleSoft, J.D. Edwards, and Baan, have become familiar names.

ERP is a structured approach to optimizing a company's internal value chain. The software, if fully installed across an entire enterprise, connects the components of the enterprise through a logical transmission and sharing of common data with an integrated ERP. What ERP really does is organize, codify, and standardize an enterprise's business process and data. The software transforms transactional data into useful information and collates the data so that it can be analyzed. In this way, all of the collected transactional data becomes information that companies can use to support business decisions.

The E-Business approach of customer-centrism requires placing the entire corporation into a unified transaction environment. This strategy implies having one common platform instead of many software applications in independent silos. The multiple applications comprising ERP are themselves built from smaller software modules that operate specific business processes within functional areas. These enable companies to plan and manage resources on a real-time basis. When changes are entered into one module of the system, other related data elements and modules are automatically updated. The modules are delineated by core business functions such as finance, manufacturing, sales, and human resources. The business functions are addressed via smaller modules, which operate specific business processes. For example, a manufacturing application normally includes modules that permit sales and inventory tracking, project raw material requirements, and plan plant maintenance. The underlying integration across various modules provides operational transparency, which allows managers to follow what's happening across the business, even on a global basis.

ERP suites that are designed for a multinational company (MNC) are highly sophisticated. To function effectively, the MNC's needs to integrate business information across the organization; accommodate diverse business practices and processes that are integrated into a synergistic whole; manage resources across the enterprise; and support multiple languages, currencies, and jurisdictions. The ERP architecture is designed to mask the complexities of underlying platform technologies, thus enhancing flexibility and simplifying software modification. Customers can modify the application suites to accommodate their business practices, without having to worry about the underlying hardware, software, and network technologies. [4], [28]

2.7.1 Evolution : From MRP To ERP

The first stage of ERP was Material Requirements Planning or MRP. This is the model that pertained after the war up until the mid-seventies, when things started to change. MRP, where the simple goal was to base the purchasing plan of the company on the production plan. Instead of having inventory available, the idea was to have inventory available when production required it and then only in the quantities that will be necessary for production.

The very first MRP systems started with the production plan. A computer system which takes the demand forecast, converts it to a production plan, takes, quantities and production dates from the production plan, multiplies them with the raw materials quantities from the BoM, subtracts the current inventory, takes delivery lead times into account and spits out a purchase order is essentially a basic MRP system.

MRP II (which stands for manufacturing resource planning) is just an extended discussion about MRP. MRP II starts to spit out commands to delay or stop delivery on purchases because company may have raised a purchase order for something do not need yet, or, worse still, at all. It also starts to create production orders for the 'intermediates' which company have to produce in their own factory rather than purchase, and this is fed back to the production plan, which in turn generates more requirements.

The production plan should be based upon a sales and marketing plan for the company so that it has the right things to sell at the right time, and so the production planning itself should be based on the expected demand - if it is not, then the company is usually known as 'production driven'.

Enterprise Resource Planning (ERP) is Manufacturing Resource Planning (MRP II) with some additional features and, in most cases, better integration of the MRP II modules by the mid eighties. The additional features vary from system to system but are usually human resource management and salaries, document control and, sometimes, maintenance. [29]

2.7.2 ERP Functions

The functionality of corporate applications can be divided into several broad areas: [29]

- **Back-office operations:** Areas such as manufacturing, accounting and financial management, plant maintenance, inventory and order management, and human resources were the first to be covered by ERP systems, which integrated these previously disparate functions into one package.

- **Supply chain management (SCM):** This function enables companies to optimize the entire logistics, production, and distribution process, from acquiring raw materials from suppliers to scheduling production and shipping products to customers on time. An enabled SCM system lets customers set up a virtual supply chain on the Internet; which helps unify planning across the supply chain, independent of location, materials, time horizons, manufacturing methods, or constraints.

- **Sales force automation (SFA):** SFA adds functionality to aspects of the sales process such as contact management, sales forecasting, and order management.

- **Customer relationship management (CRM):** CRM connects the various experiences a customer has with a company-marketing, product selection, purchasing, receiving, complaints and post-sale support-into a managed relationship, where a company is able to identify which customers it should focus its limited resources on and how to do so effectively. The other theme of CRM is to provide a seamless customer experience to encourage customer retention.

2.7.3 Driving Force Of Migration To ERP

The key business drivers forcing migration to ERP systems vary in intensity across different industries and companies, but they include some or all of the following: [29]

- **Companies have grown with disparate, decentralized systems** (often through mergers and acquisitions) that prohibit different functional units from communicating easily. For instance, finance doesn't talk to manufacturing, which doesn't talk to marketing. Whilst each works well on its own, the disjointed infrastructure can create an environment of confusion, misunderstanding, errors, and limited use of corporate information assets.

- **To provide the digital nervous system necessary to deliver information** to those who need it, in real-time, and not with several days or weeks delay. Managers want to know how much they've sold, what they've shipped, why inventory looks the way it does, the status of collectables, the profitability of programs or product lines and so on. Most legacy applications cannot deliver this to managers, because information is integrated manually and thus, neither reliable nor timely.

- **The need to integrate a broad range of disparate silo-like processes**, such as manufacturing, finance, distribution/logistics, and human resources into a common denominator of overall functionality.

- **To manage local activities and coordinate worldwide operations**, applications must change. This change must happen for three reasons: tougher business conditions accentuated by channel and brand proliferation, the pressures of managing globally, and intense service demands by customers. With globalization has come price pressure as customers insist that manufacturers produce higher-quality goods with shorter delivery times and lower prices.

- **In many industries, new government demands such as deregulation drive application requirements.** Other recent regulatory changes affecting all industries include Y2K compliance and euro conversion.

- **The need to create a new foundation on which next-generation applications can be developed.** The goal is to deploy application frameworks that reflect current industry practices and are capable of being supplemented by "best of breed" ancillary applications such as SCM, HRM, E-Procurement, CRM etc.

- **The need to create a framework that will improve customer order processing.** Most companies have ignored their back-office systems for years, and they are now looking for solutions that will save them from this neglect.

2.7.4 ERP Implementation

There are three possible strategies that can be employed in implementing an ERP system:

1. A step-by-step approach, in which one module at a time is installed, tested, and integrated with other systems.
2. A "big bang" technique sweeping away all old systems at once.
3. A "modified big bang" approach, in which various modules are implemented at one time, piloting them in one area of the company and then extending the program throughout the firm.

Similar to all complicated projects, the implementation of an ERP system goes through a number of phases. [29]

1. In the project preparation phase, all the arrangements for the project team are made. This phase also includes the estimation of project resources, costs, and duration of each activity.

2. During the blueprint phase, the consultants document the requirements of the enterprise and its business process design, including interviewing potential users.

3. In the pilot phase, the software is configured to match the structure of the company with the desired business processes. The technical team members plan the interfaces and data integration infrastructure of the new system.

4. In the final phase, all the work from the previous phases is consolidated, with the goal of preparing the system for final acceptance. This phase covers the final system test, user training, and migration of the data to the new sys-tem. Moreover, all the conversion and interface programs are verified, as is the scalability of the system. Finally, the user acceptance tests are run.

5. The assessment phase reviews the system to ensure that all business requirements were met. This includes checking the business processes and technical architecture as well as checking with the end users, assuring that their expectations was met. Finally, the business benefits of the new system are measured, allowing the company to determine the ultimate return on investment.

2.7.5 What Can ERP Do For Business?

ERP give on-line/real time information throughout all the functional areas of an organization. It allows customization and data standardization. ERP running based on reliable

file structure and accuracy across the enterprise. Besides, ERP is forces used of "best-practices" included in the applications. It also provides tools for ad hoc inquiries.

ERP solutions are effective at streamlining business processes that cut across the functional areas of your business. ERP brings together fragmented operations, often replacing a multiplicity of legacy systems. By sharing common information across an integrated set of application modules, ERP can speed up transactions that cross your business. For instance, ERP can consolidate financial records, providing you the ability to close the books faster and more accurately.

ERP can help you better manage your inventory, driving dramatic cost savings. ERP can map customer orders to your production plans, helping to improve the cycle time to respond to customer demand. And ERP can help eliminate process duplication, wait times and information errors, yielding productivity improvements for your professionals. In addition, the regimen of an ERP implementation forces you to look at how you run your business - your processes, practices and procedures. ERP implementations are a great opportunity to institutionalize a number of changes, many of which you may have been considering for some time. The analysis and reporting of ERP that can be used for long term planning. [4]

2.7.6 ERP Benefits

Benefits of an ERP implementation also come in two varieties – quantifiable and qualitative. Some of these are illustrated in Figure 2.1. The quantifiable benefits are increased process efficiency; reduced transaction costs due to the availability and accuracy of data and the ability to turn that data into meaningful information; reduced information organization costs in hardware, software, and staff necessary to maintain legacy systems; and reduced staff-training costs over time as people become more "change ready.

Qualitative benefits include a more flexible governance and organizational structure, and a work force ready to change and focus more on high-value-added tasks and to more easily capitalize on opportunities as they present themselves. [4]

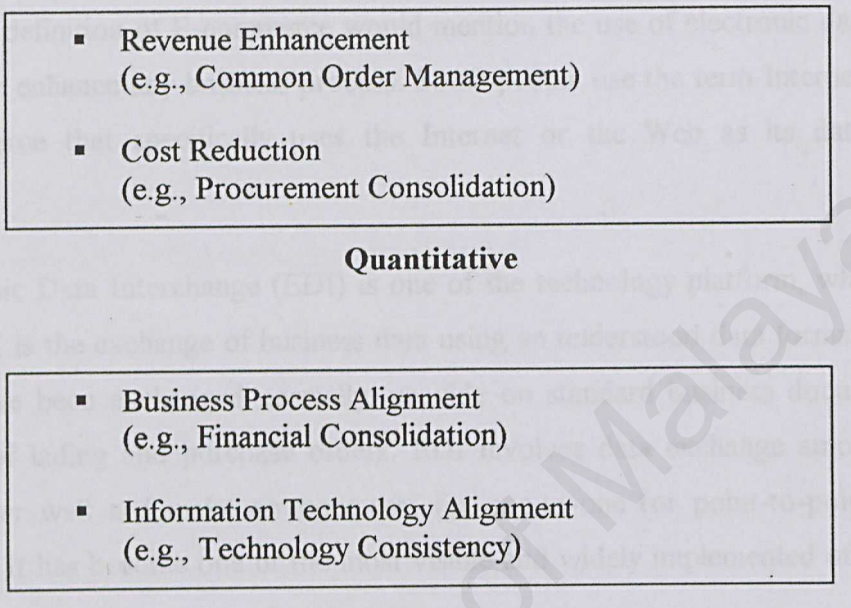


Figure2.1 ERP Benefits

2.8 Electronic Commerce

Electronic commerce (E-commerce) is commerce carried out in a revolutionary way - electronically. Instead of meeting people, visiting a store or speaking with a company representative on the telephone, people do the transactions electronically through a online network. The customer is sitting beside the computer and is watching the monitor who has become the virtual store. E-commerce transactions range from a consumer buying books, CDs, insurances, properties, or any kind of goods also all kind of services are available online.

The allure of E-commerce is that it has no geographical or time limitations; with the help of technology firms can sell 7 days a week, 24 hours a day, 365 days a year to literally anyone, anywhere. In additional, parking for customers is no problem and firms can deliver the goods right to the customer's door!

A good definition of E-commerce would mention the use of electronic data transmission to implement or enhance any business process. Some people use the term Internet commerce to mean E-commerce that specifically uses the Internet or the Web as its data transmission medium.

Electronic Data Interchange (EDI) is one of the technology platform, which used by E-commerce. EDI is the exchange of business data using an understood data format. The business data, which have been exchanged normally, provide on standard business documents, such as invoices, bills of lading and purchase orders. EDI involves data exchange among parties that know each other well and make arrangements for one-to-one (or point-to-point) connection, usually dial-up. It has become one of the most visible and widely implemented of the distributed applications.[2]

2.8.1 Traditional Commerce

The original of traditional commerce occurred before recorded history when our ancestors first decided to specialize their everyday activities. Instead of each family unit having to grow crops, hunt for meat, and make tools, families developed skills in one of these areas and traded some of their production for other needs.

Eventually, bartering gave way to the use of currency, making transactions easier to settle; however, the basic mechanics of trade were the same. One member of society had created something of value that another member of society desired. Commerce, or doing business, is a

negotiated exchange of valuable objects or services between at least two parties and includes all activities that each of the parties undertakes to complete the transaction.

Commerce transaction happens between at least two parties, sellers and buyers. Sellers often undertake market research to identify potential customers' needs. Once customer needs have been identified, sellers then create the products and services that they feel will meet those needs. This creation activity includes design, testing, and production activities. Next, sellers are to make potential customers aware that the new product or service exists. They engage in many different kinds of advertising and promotion activities to communicate information about their products and services to existing and potential customers.

One the other hand, once buyers have identified their specific needs, they must find products or services that will satisfy those needs. In traditional commerce, buyers may consult catalogs, ask friends, read advertisements, or examine directories. The Yellow Pages is a good example of a directory that buyers often use to find products and services. Buyers may consult salespersons to gather information about specific features and capabilities of products they are considering.

After buyers have selected a product or services that will meet the identified need, they must select a vendor that can supply that product or services by telephone, by mail, and at trade show. Once the buyer chooses a vendor, the buyer negotiates a purchase transaction. This transaction may have many elements, including delivery date, method of shipment, price, warranty, and payment terms, and will often include detailed specifications to be confirmed by inspection when the product is delivered or the services is performed. This may be a very complicated step.

When the buyer is satisfied that purchased product or services has met the terms and conditions agreed to by both buyer and seller, the buyer will pay for the purchase. After the sales is complete, the buyer may have further contact with the seller regarding warranty claims, upgrades, and regular maintenance.[6]

2.8.2 A Model Of Electronic Commerce

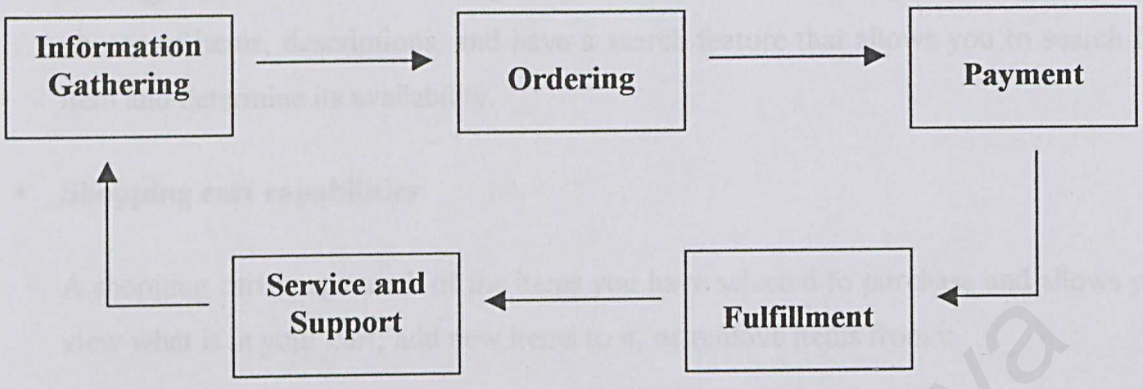


Figure 2.2 : A Model Of Electronic Commerce

Figure 2.2 shows a model of electronic commerce with five phases: information gathering, ordering, payment, fulfillment, and services and support. Firms will identify demands first, then advertise and promote their offerings to prospective customers through Internet email and the Web. Customers can order and pay for products and services online. If the product or service can be digitized, it can be delivered online, as in the case of information-based products, videos, and software. Lastly, the firms have to give service and support to their customers' use of their product after sales.[2]

2.8.3 Electronic Commerce Requirements

Electronic commerce software must be hosted on a Web server. Once you have located or built a host server, such as Microsoft Internet Information Server, Apache, or Netscape Enterprise Server, you can investigate and install electronic commerce software.

Simply states, though, all electronic commerce solutions must provide at least:

- **A catalog display**

  Catalog, which is a static listing of goods and services. Larger catalogs can feature photos of items, descriptions, and have a search feature that allows you to search for an item and determine its availability.

- **Shopping cart capabilities**

  A shopping cart keeps track of the items you have selected to purchase and allows you to view what is in your cart, add new items to it, or remove items from it.

- **Transaction processing**

  Transaction processing occurs when the shopper proceeds to the virtual checkout counter by clicking a checkout button. Then the electronic commerce software performs any last-minute calculations, such as volume discounts, sales tax, and shipping costs. At checkout, the browser normally switches into a secure state of communication.

- **Tools to populate the store catalog and to facilitate storefront display choices**

  Business-to-business electronic commerce conducted over the Internet, extranets, and intranets requires tools and capabilities different from those required to implement most business-to-customer Web sites. Business-to-business system, for example, usually requires tools not standard in business-to-customer systems, such as encryption, authentication, digital signatures, and signed receipt notices.

The best electronic commerce software will perform sales report generation on demand, allowing store managers to see the latest figures on what is selling, what is popular, and other important sales information. Also, Web advertisements, a fact of Web life, should be rotated and replaced automatically by the software. [6]

2.8.4 The Advantages Of Electronic Commerce

All the advantages of electronic commerce for business entities can be summarized in one statement: electronic commerce can increase sales and decrease costs. [6]

- Advertising done well on the Web can get even a small firm's promotional message out to potential customers in every country in the world.
- A firm can use electronic commerce to reach narrow market segments that are widely scattered geographically.
- The cost of handling sales inquiries, providing price quotes, and determining product availability can be reduced.
- New suppliers and business partners can be identified through the purchasing processes.
- Increase the speed and accuracy with which businesses can exchange information, which reduces costs on both sides of transactions.
- Provides buyers with a wider range of choices than traditional commerce. They can consider many different products and services from a wider variety of sellers.
- Provides buyers with easy way to customize the level of detail in the information they obtain about a prospective purchase. They no need to wait days for the mail to bring a catalog or product specification sheet, or even minutes for a fax transmission.
- Electronic payments of tax refunds, retirement, and welfare support cost less to issue and arrive securely and quickly when transmitted via the Internet.
- Enable people to work at home, we all benefit from the reduction in commuter-caused traffic and pollution.
- Make the products and services available in remote area.

2.9 Electronic Marketing

2.9.1 What Is Electronic Marketing?

What is electronic marketing? Although literally hundreds of references to electronic marketing have appeared in both the popular press and academic literature in the past couple of years, no agreed-upon definition currently exists. The following are representative dictionary excerpts of electronic marketing:

- Electronic marketing relatively narrowly as selling online or via the Internet. It can be viewed broadly as including television, radio, telephones, multimedia kiosks, video catalog, and so forth.

- Electronic marketing as utilizing electronically generated consumer purchase information in marketing and sales promotion activities; used in supermarkets and other stores where information is received by having customers use computer-readable cards, such as bar code, that log data on their product purchases.

- Electronic marketing must be based on widely affordable, standardized, or specifically modifiable products; on information (when there is not necessarily a physical product); and on limited services (such as travel or event reservations). For electronic marketing to work, customers must have some preconceived ideas of what they want to buy.

Marketing is typically defined as "a social and managerial process by which individuals and groups obtain what they need and what they want through creating, offering, and exchanging products of value with others". When modifying marketing, the word "electronic" implies the use of electronic devices, appliances, tools, technologies, techniques, and / or systems in marketing. Thus, if electronic marketing is in fact marketing that is accomplished or facilitated

through the application of electronic devices, appliances, tools, techniques, technologies, and / or systems, then much of what passes for marketing today can be called "electronic marketing". [7], [30]

2.9.2 Definition Of Electronic Marketing

From the representative dictionary excerpts of electronic marketing above, we can assumed that electronic marketing is all online or electronic-based activities that facilitate manufacturing goods and services by the producer to satisfy the wants and needs of the consumer. Electronic marketing draws heavily on networks' technology to coordinate market research, aid product development, develop strategies and tactics to persuade consumers to buy, provide for online distribution, maintain customer records, conduct customer satisfaction services, and gather customer feedback. Electronic marketing advances the overall marketing program that in turn supports the corporate objectives of electronic commerce.

Electronic marketing affects traditional marketing in two ways. First, it increases efficiency in traditional marketing functions. Second, the technology of electronic marketing transforms many marketing strategies. The transformation results in new business models that add customer value and / or increase company profitability. These models will be highlighted shortly. [5], [8]

2.9.3 Objectives Of Electronic Marketing

There are several objectives that could be chosen for marketing online. [8]

- **Initiate an online awareness as an extension of the product's or services promotional program.** In this case, copy and graphics would adhere to existing advertising or sales

promotion themes. Web site marketers and designers were creating sites with user-friendly, memorable graphics, sound, and motion. Web sites have become unique vehicles in which consumers can exercise control over the information they choose to access or to disregard.

- **Web site could be assist the overall media plan,** targeted either to a consumer or a trade group, with an online product or service introduction. The media planner can use online advertising as a primary vehicle with traditional media support or choose to use online advertising as a support medium for traditional media awareness. Not only do Web resources produce a two-way dialogue, the Web performs its functions with great speed.

- **Improve the dialog and react quickly to consumer service inquiries.** An e-mail address for customer comments or complaints is an excellent companion to the steadfast toll-free telephone number. A well considered set of frequently asked questions (FAQs) can oftentimes substitute as an answer key, saving time for all customers service representatives.

- **Technical support can be enhanced by e-mail communications.** Customers can e-mail hardware or software questions to the technical people who can guide the caller through the anticipated problem. The assumption is that written, meaning e-mail, responses can be collected through the evening and overnight periods to be later handled in batches such as on the day shift. This asynchronous strategy can reduce labor costs by eliminating the need for technical specialists on call twenty-four hours a day and thus distributing the workload evenly.

- **The Web is conducive for testing new product or service concepts** among friends such as current customers or dealers or even with new prospect groups. Since the Web site address can be passed around quietly, the marketer can gather input in private, and then a new iteration can be tested again and again.

2.9.4 New Rules Of Electronic Marketing

From traditional marketing to electronic marketing, this term represent the shift from physical products to digital products and process: for example, form print media delivered in paper form at the newsstand to digital information delivered via a Web site over computer networks. Some call this the change from marketplace to market space. Whatever it is called, it means the text, graphics, audio, and video can be sent from firms to stakeholders and back again like magic over the Internet.

This phenomenon created numerous new rules for organizations. The 10 new rules could be considered underlying principles for conducting business in the digital economy.

1. **Power shift sellers to buyers.** It started with channel surfing and the remote control, and it is ending with control of the mouse. Both individual and business buyers are more demanding than ever because they are just one click away from a plethora of global competitors, all vying for their business. In this environment, buyer attention is the scarce commodity and customer relationship capital a valued asset.

2. **Increasing velocity.** In the transparent environment of the Web competitors know instantly what the others are doing, and imitation is easy. For example, one day there was eBay, and the next day Amazon.com and a number of other firms offered online auctions.

3. **Death of distance.** Geographic location is no longer a factor when collaborating with business partners, supply chain firms, or customers, or just chatting with friends. The Internet made place unimportant because people can meet inexpensively in cyberspace regardless of whether or not they ever meet face-to-face. This phenomenon allows many buyers and sellers to bypass traditional intermediaries.

4. **Global reach.** The Internet created a borderless global economy where marketers can reach an incredibly larger number of people than with traditional media. This creates challenges as well as opportunities for firms who want to distribute products worldwide and provide post purchase service.

5. **Time compression.** Online stores can run on automatic pilot 24/7, and people can communicate asynchronously as their schedules permit. Time zones, disappear for managers needing to collaborate with business partners halfway across the world.

6. **Knowledge management is key.** Marketers have better information on their customers and better information for them. In the digital world, customer information is easy and inexpensive to gather, cheap to store, and fruitful to mine.

7. **Market deconstruction.** In the absence of time and space constraints, traditional product bundling no longer holds. This is especially true when physical products can be separated from the information with which they are associated. For example, consumer can perform their function at a different time and at a different web site. This structural transformation of markets opens the possibility for unlimited combinations of products and services worldwide.

8. **Interoperability.** One of the most significant developments of the Web is the movement toward open standards for software design. Open standard exist in the public domain and are sanctioned by international bodies.

9. **Interdisciplinary focus.** There was a shift from hierarchical to matrix organizations that predate the Web. What's new is the need for the marketing and MIS disciplines to work together very closely. The results is that when a consumer orders from a Web site, the firm will be able to fulfill the order properly, replenish its supply from the manufacturer, and provide online customer support.

10. **Intellectual capital rules.** Imagination, creativity, and entrepreneurship are more important resources than is financial capital. Intangible assets such as intellectual capital and enterprise knowledge draw investor much more quickly than do tangible assets such as physical plants and warehouses.

These are the outlined 10 fundamental changes in the digital economy, it is important to restate that some things don't change: Treat customers and partners with care, create a sustainable competitive advantage, and follow time-proven marketing. [5]

2.9.5 Marketing On The Internet

Doing business on the Web is really doing business as usual – with a twist. The twist is using the powerful capabilities of the Web to build virtual personal relationships with customers. Building effective virtual personal marketing relationships on the Web begins with *effective marketing*. All marketers start with business goals that include:

- Increasing revenue
- Advertising and promoting products and services
- Keeping current customers happy and acquiring new ones
- Increasing costs
- Enhancing image and branding

The Web provides powerful capabilities that can enhance and enable the efforts to achieve each of these business goals. Marketing efforts typically focus on seven key business areas:

- **Products and Services Marketing:** product marketing, pricing, positioning, demonstrations (demos), distribution, marketing programs, partnerships, and other strategic activities.

- **Fulfillment:** enabling ordering as well as acquisition, authorization, and authentication of customer funds; enabling the flow of goods and services from sellers to buyers through all wholesalers, jobbers, distributors, dealers, and representatives.

- **Advertising and Promotion:** development and dissemination of image and brand-enhancing persuasive information about products and services.

- **Customer and Business Tracking:** market research to determine customer needs and evaluate business performance in meeting those needs.

- **Customer Services and Support:** technical support, customer services, requests for information, product registration, and warranty services.

- **Corporate Communications:** product and services information, press releases, and related information for buyers, suppliers, contractors, dealers, representatives, shippers, and so on.

- **Customer Communications:** customer feedback and requests for information.

Each of these functions and activities can be enabled and enhanced on the Web with powerful interactive communications capabilities. In most cases, the featured companies present comprehensive, easy-to-use, easy-to-access information. They get customers involved by using interactivity. They utilize the power of advanced Web technologies to achieve important business goals and maximize their return on investments in the Web. [9]

2.9.6 4Ps Concept In Marketing

2.9.6.1 Product Strategy

A number of product characteristics have been found to influence the success of new products and brands. There is no absolute demarcation, but some of the dimensions are more directly involved with facilitating trial, whereas others both facilitate trial and encourage brand loyalty. Below is the discussion each of these product characteristics. [10]

- **Compatibility**

  Compatibility refers to the degree to which a product is consistent with consumers' current affect, cognition, and behavior. Other things being equal, a product that does not requires an important change in consumer values and beliefs or purchase and use behaviors are more likely to be tried by consumers.

- **Trialability**

  Trialability refers to the degree to which a product can be tried on a limited basis or divided into small quantities for an inexpensive trial. Other things being equal, a product that facilitates a non-purchase trial or a limited-purchase trial is more likely to influence the consumer to try the product.

- **Obervability**

  Obervability refers to the degree to which other consumers can sense products or their effects. New products that are public and frequently discussed are more likely to be adopted rapidly.

- **Speed**

  Speed refers to how fast the benefits of the product are experienced by the consumer. Because many consumers are oriented toward immediate rather than delayed gratification, products that can deliver benefits sooner rather than later have a higher probability of at least being tried.

- **Simplicity**

  Simplicity refers to the degree to which a product is easy for a consumer to understand and use. Other things being equal, a product that does not require complicated assembly and extensive consumer training has a higher chance of trial.

- **Competitive Advantage**

  Competitive advantage refers to the degree to which an item has a sustainable competitive advantage over other product classes, product forms, and brands.

- **Product Symbolism**

  Product symbolism refers to what the product or brand means to the consumer and what the consumer experiences in purchasing and using it. Consumer researchers recognize that some products possess symbolic features and that consumption of them may depend more on their social and psychological meaning than on their functional utility.

2.9.6.2 Promotional Strategy

The promotional mix consists of advertising, sales promotion, public relations, personal selling, and direct marketing. Each element has its strengths and weaknesses, and electronic communications can mitigate some of these weaknesses that have hampered the promotional mix for decades. Some elements are more effective at launching a new product or introducing a new brand extension, while some are better at creating credibility for the corporate image. [5], [8]

1. **Advertising** is non-personal communication of information, usually paid for and usually persuasive in nature about products (goods and services) or ideas by an identified sponsor through various media. Banner ads and buttons are currently the predominant forms of online advertising; however, sponsorships and other forms are also important.

   Some of the advantages of advertising include the following:

   - In relative costs, advertising is an efficient method to communicate with large audiences, especially for national markets.
   - Advertising can also be used to create images and symbolic appeals for a company or brand that is important for establishing goods appealing to differentiated or functional attributes.
   - Advertising is a high profile, image-oriented promotional element well suited for brand awareness.

   Some of the disadvantages of advertising include the following:

   - The cost of national advertising coverage is expensive as are the production costs for creating the advertisement or commercial.
   - National advertising is not selective in targeting specific target audiences, therefore, creating much wasted coverage or readership.
   - In general, advertising materials must be produced far in advance and allow little flexibility in making changes to advertisements or commercials quickly.

2. **Sales promotions** are short-term incentives of gifts or money that facilitate the movement of products from producer to end user. Some firms e-mail coupons, sweepstakes information, and other sales promotions to customers and potential customers. Promotions may also appear in banner ads or on a site's Web page itself.

Some of the advantages of sales promotions include the following:

- Sales promotions can cause a rapid increase in sales activity and volume.
- The various techniques of sales promotion can attract new buyers to trial purchases.
- Sales promotions can reward loyal customers as they continue to be product users.

Some of the disadvantages of sales promotions include the following:

- Marketers and retailers can become dependent on sales promotions by training their customers to buy only when the product is featured as a special offer.
- Matching competitors' sales promotions can lead to a sales promotions spiral in which no competitor can afford to not participate, as in double or triple frequent flyer mileage rewards.
- Extensive sales promotions can erode brand perception because of the discount nature of sales promotions.

3. **Public relations** consist of activities that influence public opinion and create goodwill for the organizations. Many Web sites are designed to serve as public relations vehicles. The Rollerblade site is a great example of public relations (www.rollerblade.com). Comprehensive information is offered about all facets of the spot of inline skating.

Some of the advantages of public relations include the following:

- Because of its attitude surveys, public relations can act as an early warning system to protect the organization's franchise within the community and with its audiences.
- A through public relations program can earn the company's recognition as a solid community citizen.
- Public relations are a low-cost promotional strategy.

Some of the disadvantages of public relations include the following:

- Public relations can be positive or negative; negative public relations can do irreparable harm to the organization's reputation and its relationships with its public.
- Public relations programs are not always under the control of the marketer; many programs take months or years to cultivate into positive results.
- Public relations plans are extremely time consuming since PR programs should be developed for each of an organization's constituents; these audiences could number ten or more.

4. **Personal selling** is a direct face-to-face presentation to potential buyers. By definition, personal selling is not possible on the Internet, though the Internet can be used to generate sales leads.

Some of the advantages of personal selling include the following:

- Depending on the reaction of the prospect, dyadic communication allows the sender to alter or tailor the message according to the prospect's inquiries; with electronic communications, this would be considered interactivity.
- As in the term, personal selling is a face-to-face experience, disregarding mass media.
- Personal selling yields more immediate and precise marketing results.

Some of the disadvantages of personal selling include the following:

- The reach of personal selling is extremely limited since an individual can meet with so few clients, customers, or prospects each day or month.
- There often is concern among management that the field sales representative is not presenting the product or services with the same and consistent information that the home office intended.

- Many times the purchase cycle can be quite long, perhaps several years in the purchase or repurchase of durable goods.

5. **Direct marketing** is direct communication through non-personal media with carefully targeted individuals to obtain an immediate response. It includes such techniques as telemarketing, outgoing e-mail, and postal mail – of which catalog marketing is a big part. In some ways targeted banner ads and other forms of advertising and sales promotions could be considered direct marketing.

Some of the advantages of direct marketing include the following:

- Direct marketing pieces can contain large amounts of products or services information.
- Direct marketing allows for the capability to personalize direct mail, magazine, and Web messages by adding the recipient's name to envelopes, cover letters, e-mails, and Web sites.
- Direct marketing has the ability to send product samples to prospects or target users of a competing brand.

Some of the disadvantages of direct marketing include the following:

- The cost of direct marketing using traditional media are high since the message is presented to target groups usually small in number
- There are image problems that are traced to junk mail, to annoying telemarketing calls, or to "spamming" e-mail; all three are examples of unsolicited advertising messages.
- As with advertising, direct marketing fights the clutter problem.

2.9.6.3 Pricing Strategy

(A) Conceptual Issues In Pricing

From a consumer's point of view, price is usually defined as what the consumer must give up to purchase a product or service. Research typically views price only in term of dollar amount asked or paid for an item or service. Price is believed as a pivotal element in the exchange process, so here offer a conceptual view of price that encompasses more than the dollar amount or financial cost to the consumer.

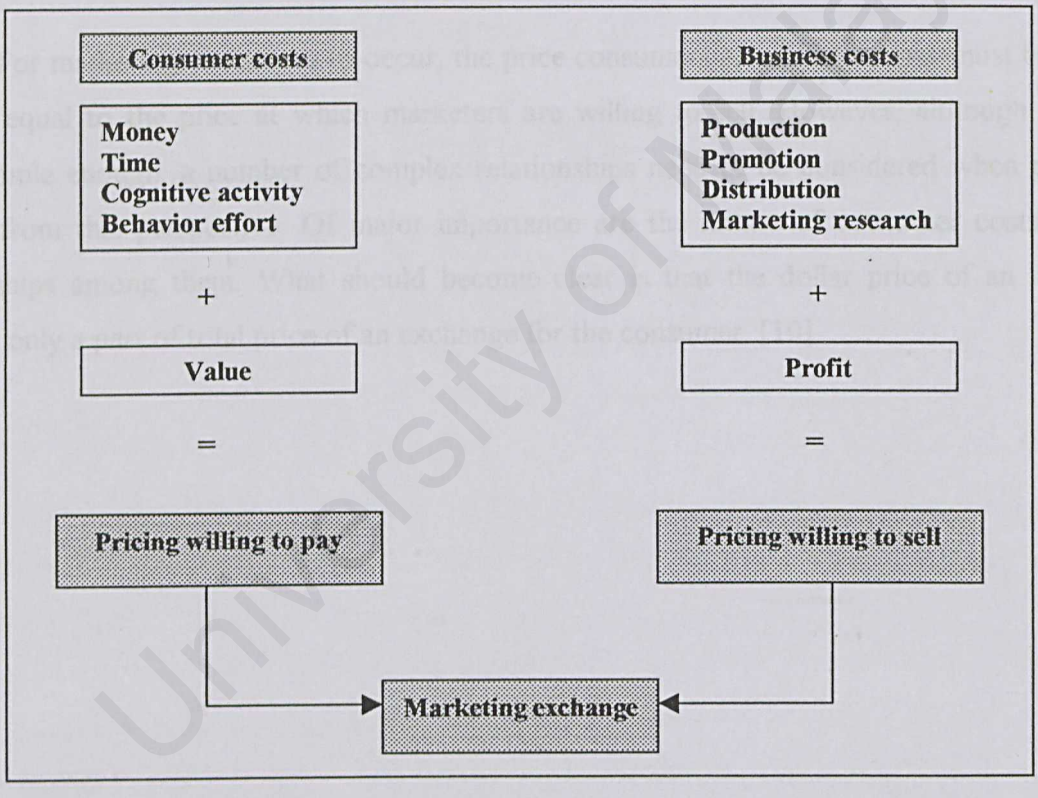


Figure 2.3: The Pivotal Role Of Price In Marketing Exchanges

Figure 2.3 offers a general model of the nature of marketing exchanges and highlights the role of price in this process. It identifies four basic types of consumer costs: money, time, cognitive activity, and behavior effort. These costs when paired with whatever value or utility the product offers, are a convenient way to consider the meaning of price to the consumer. Besides, it has also divided marketing costs into four categories of production, promotion, distribution, and marketing research. Most business investments could be attribute to one or another of these categories. These costs, when paired with the desired level of profit a firm seeks, offer a convenient way to consider the marketing side of the exchange equation. Basically, the model implies that products must usually cover at least variable costs and make some contribution to overhead or profits for the offering to be made to the marketplace.

For marketing exchanges to occur, the price consumers are willing to pay must be greater than or equal to the price at which marketers are willing to sell. However, although this may seem simple enough, a number of complex relationships need to be considered when pricing is viewed from this perspective. Of major importance are the nature of consumer costs and the relationships among them. What should become clear is that the dollar price of an item may often be only a part of total price of an exchange for the consumer. [10]

(B) Strategic approach To Pricing

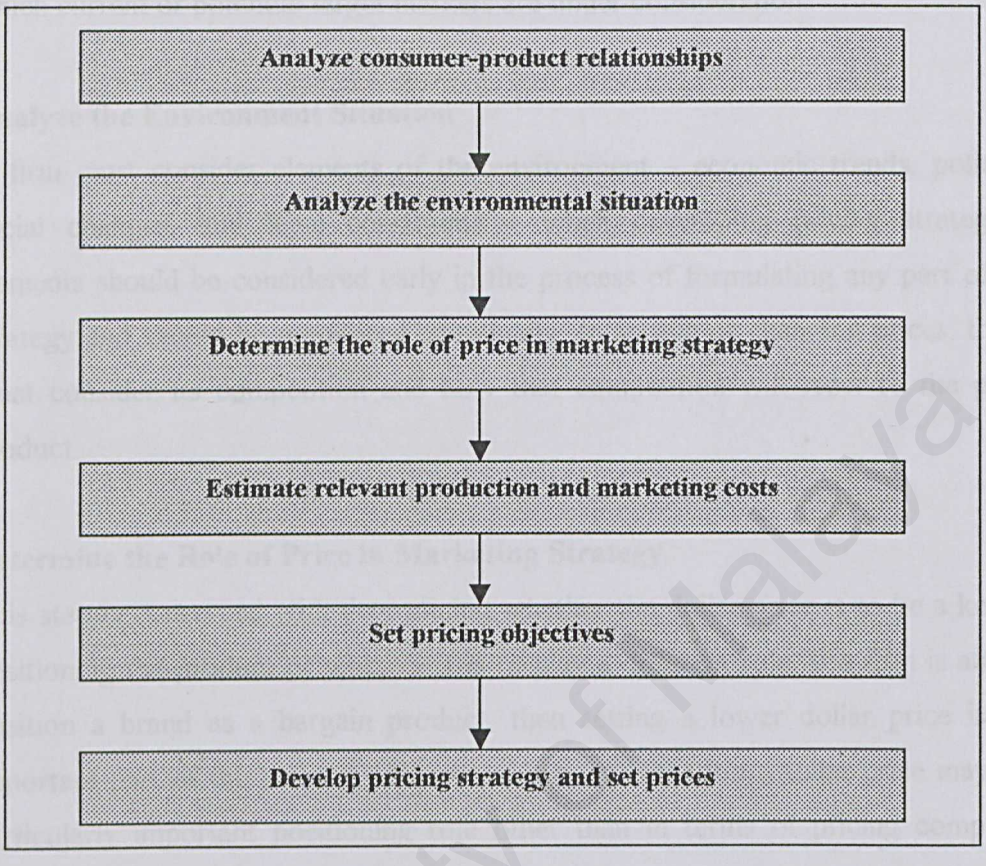


Figure 2.4: A Strategic Approach To Pricing

Figure 2.4 is intended to clarify the role of consumer analysis in pricing and to offer a useful overview of the pricing process. This strategic approach to pricing consists of six stages. There are: [10]

1. **Analyze Consumer-Product Relationships**

   Whether the pricing strategy is being developed for a new or existing product, a useful first stage in the process is to analyze the consumer-product relationships. Answers must be found for questions such as: How does the product benefit consumers? What does it mean to them? In what situations do they use it? Does it have any special psychological

or social significance to them? Of course, the answers to those questions depend on which current or potential target markets are under consideration.

2. **Analyze the Environment Situation**

A firm must consider elements of the environment – economic trends, political views, social changes, and legal constraints – when developing pricing strategies. These elements should be considered early in the process of formulating any part of marketing strategy and should be monitored continually. In setting or changing prices, the firm also must consider its competition and how that competition will react to the price of the product.

3. **Determine the Role of Price in Marketing Strategy**

This step is concerned with determining whether the dollar price is to be a key aspect of positioning the product or whether it is to play a different role. If a firm is attempting to position a brand as a bargain product, then setting a lower dollar price is clearly an important part of this strategy. However, in many situations, dollar price may not play a particularly important positioning role other than in terms of pricing competitively. If consumers enjoy greater convenience in purchasing, or if the product has a clear competitive advantage, the price may be set at or above those of the competition but not highlighted in positioning strategy.

4. **Estimate Relevant Production and Marketing Costs**

The costs of producing and marketing a product effectively provide a useful benchmark for making pricing decisions. The variable costs of production and marketing usually provide the lowest dollar price a firm must charge to make an offering in the market. However, there are some exceptions to this rule. These exceptions typically involve interrelationships among products. For example, a firm may sell an item below cost to build traffic and increase sales of other items.

5. **Set Pricing Objectives**

   Pricing objectives should be derived from overall marketing objectives, which, in turn, should be derived from corporate objectives. In practice, the most common objective is to achieve a target return of investment. This objective has the advantage of being quantifiable, and it also offers a useful basis for making not only pricing decisions but also decisions on whether to enter or remain in specific markets. However, marketers should be aware of the sensitivity of profits to small differences in the price they receive for their products and services.

6. **Develop Pricing Strategy and Set prices**

   A thorough analysis in the preceding stages should provide the information necessary to develop pricing strategies and set prices. The pricing task now is to determine a pricing strategy and specific prices that are (1) sufficiently above costs to generate the desired level of profit and achieve stated objectives, (2) related to competitive prices in a manner consistent with the overall marketing and positioning strategy, and (3) designed to generate consumer demand based on consumer cost trade-offs and values.

2.9.6.4 Channel Strategy

Marketing managers have many decisions to make in designing effective channels to serve consumers. For example, decisions must be made as to whether to market directly to the consumer through company-owned of franchised stores or indirectly through the combinations of intermediaries such as independent retailers, wholesalers, and agents. Decisions must be made as to whether to use store retailing or non-store retailing or some combinations of the two. Decisions must be made about plant and warehouse locations, how products will be delivered to consumers, and who will perform what marketing functions within the channel.

Channel strategy highlights the fact that different members of a distribution channel may be primarily concerned with influencing different consumer behaviors. This is an important points; the role of retail management is often overlooked in discussions of marketing and consumer behavior. Retailers affect consumers most directly, and perhaps most influentially, for many types of products and most services. Channel strategy is always view from the manufacturer's perspective and considers criteria for selecting channel members, particularly retailers.

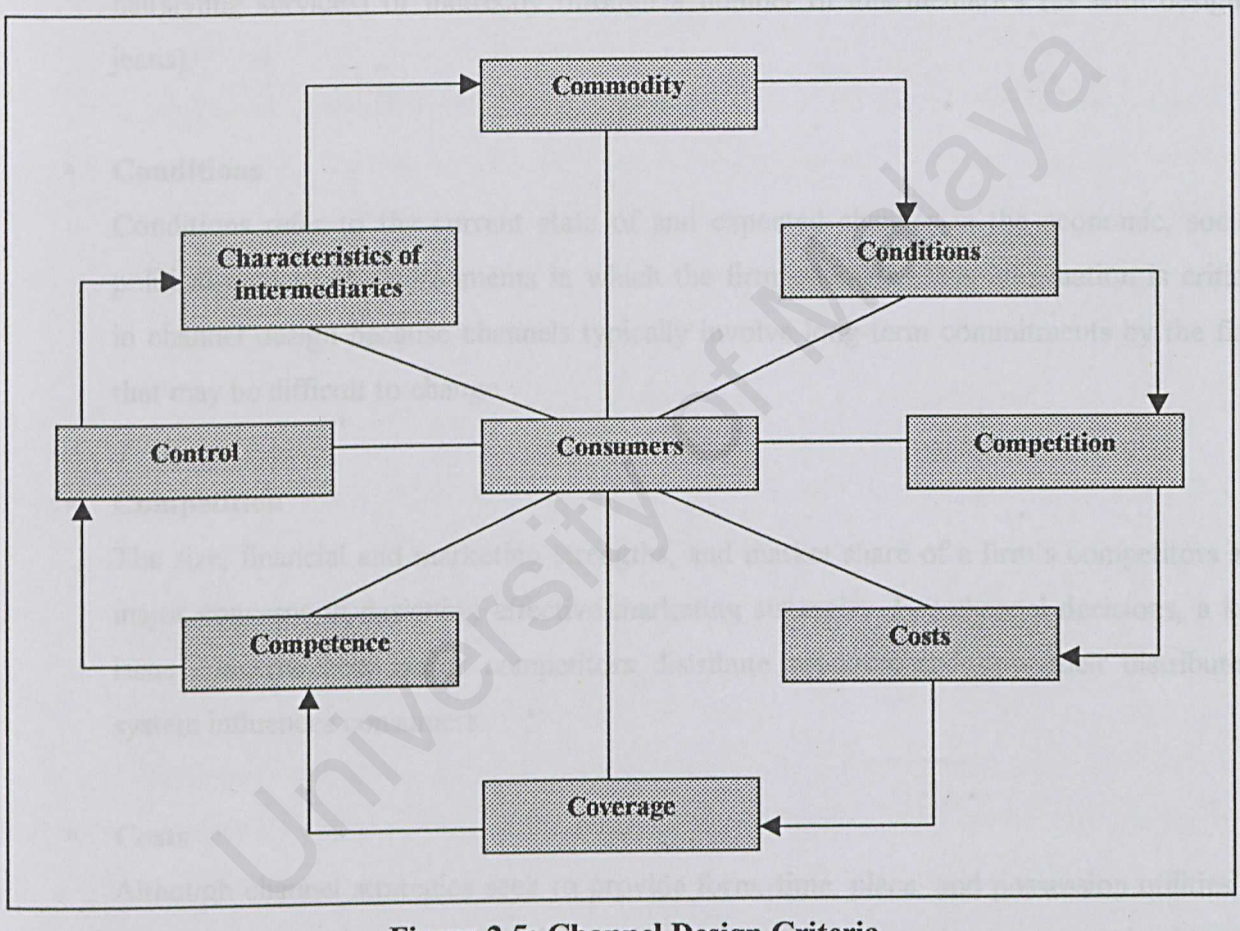


Figure 2.5: Channel Design Criteria

As with the other elements of the marketing mix, the starting point for designing effective channels is an analysis of consumer-product relationships. Figure 2.5 presents some factors that must be analyzed both in terms of their relationships with and impact on the consumer and in

terms of their relationships with the other variables. The following briefly discuss each of these factors, starting with commodity. [10]

- **Commodity**

  Different products and services vary in their tangibility, perishability, bulkiness, and degree of standardization, amount of service required, and unit value. These factors influence whether it is effective to market the commodity directly to consumers (as with hairstyling services) or indirectly through a number of intermediaries (as with designer jeans).

- **Conditions**

  Conditions refer to the current state of and expected changes in the economic, social, political, and legal environments in which the firm operates. This information is critical in channel design because channels typically involve long-term commitments by the firm that may be difficult to change.

- **Competition**

  The size, financial and marketing strengths, and market share of a firm's competitors are major concerns in designing effective marketing strategies. For channel decisions, a key issue concerns how major competitors distribute products and how their distribution system influences consumers.

- **Costs**

  Although channel strategies seek to provide form, time, place, and possession utilities to influence consumer affect, cognition, and behavior, these strategies are constrained by the cost of distribution. Distribution costs include transportation, order processing, costs of lost business, inventory carrying costs, and materials handling. Thus, costs can be viewed as a constraint on the firm's ability to distribute products and services and to serve and influence consumers.

- **Coverage**

  The term coverage has two separate meanings in channel strategy. First, there is idea that seldom can every member of a selected target market receive sufficient marketing coverage to bring about an exchange. Second, coverage also refers to the number of outlets in a particular geographic area in which the product or services will be sold. Distribution coverage can be viewed along a continuum ranging from intensive through selective to exclusive distribution.

- **Competence**

  A frequently overlooked criterion in designing channels is the firm's competence to administer the channels and to perform channel tasks at all levels to ensure effective distribution to the consumer. Both financial strength and marketing skills are crucial, but many production-oriented firms seriously underestimate the importance of marketing and overestimate their marketing abilities.

- **Control**

  An important managerial criterion in designing is the degree of control desired for effective marketing of the product to the consumer. In general, there is greater control in direct channels because no intermediaries are involved.

- **Characteristics of Intermediaries**

  A final but extremely important consideration in designing channels concerns the characteristics of the intermediaries that are available and willing to handle the manufacturer's product. If no acceptable intermediaries are available, then the firm must market directly, encourage the development of intermediaries, or forgo entering a particular market.

2.9.7 The Future Of Electronic Marketing

Although technology has always influenced marketing, its impact never been greater, nor has the rate of technology-driven change ever been faster, than it is today. New technologies will have emerged that ultimately will impact marketing, particularly electronic marketing, in ways we simply cannot now imagine, no matter how creative or future oriented we are. [7]

The following are the predictions of electronic marketing in the future:

- **Improved Market Information For Sellers**
  New technology will facilitate an expansion of the rapidly growing database marketing trend. The implementations of new technology merges with marketers' continuing efforts to collect, analyze, and interpret data. In the future marketers will perform database functions at near real-time speed.

- **Improved Market Information For Buyers**
  Information search processes for buyers will also be enhanced. A expert systems will be designed to help consumers sift through and find the critical pieces of information. Electronic marketing will become an informative and efficient process for the buyer.

- **Increased Interactivity Between Buyers And Sellers**
  In the future, much more extensive customer input will be possible, with continuous input from idea generation to actual product launch, and even through product adoption. In short, products and services will be configured to each customer's priorities, leading to significantly increased customer power in the marketplace. Sellers will also benefit by sending electronic messages to potential customers.

- **Enhanced Interconnectivity Between Buyers And Sellers**

  Increased interactivity between buyers and sellers is facilitated by enhanced interconnectivity capabilities. Real-time buyer-seller contact in which information is obtained and used almost simultaneously by both sides through instantaneous feedback will become the norm. Moreover, exchange of information will be enhanced dramatically through improved creative and production technologies.

- **Emergence Of New Market Intermediaries**

  With the dramatic increase in information, we will experience the emergence of new market intermediaries. One obvious intermediary will be a information warehouse. Market intermediaries will do more than search for the analyze information. They will also address the fragmentation of formerly integrated selling and buying functions.

- **Expanded And More Technology-Based Channels Of Physical Distribution**

  Physical distribution through electronic channels will become widespread. Electronic channels will distribute any kind of product or services that can be converted to a digital format and transmitted either through fiber optic cable or satellites.

- **Additional Technology-Based Consumer Services**

  From marketing perspective, digitized information facilitates the delivery of consumer services. The increase in electronic communication methods will move many channel interchanges to electronic formats. Although improved information may be the most obvious form of interchange, technology-based services will range from home security to automatically upgrading computer software via the Internet as upgrades become available.

- **More Worldwide Sourcing**

  National boundaries will fall even faster than they have in recent years. Technology will enable individuals and groups to bypass existing sources of products and services and

choose those that most closely meet their needs. Competition will be facilitated not only by the Internet, but by other technologies such as ISDN (Integrated Services Digital Network), HDTV (High Definition Television), satellite transmission, 900 telephone service, CD-ROM, and interactive voice response.

- **Increased Emphasis On Building Customer Loyalty**

  As alternative sources of products and services increase geometrically, relationship marketing skills will become even more important in enhancing customers' loyalty. True partnering between buyers and sellers will be necessary, and not just the lip-service partnering so prevalent today. Understanding and responding to customers has always been the key to building customer loyalty.

- **Safeguards Designed To Provide Information Security And Buyer / Seller Confidentiality**

  New technology, however, provides increasing capabilities to capture and store large amounts of behavioral data, and therefore necessitates even more emphasis on resolving the privacy issue so that it is a win-win situation for both the buyer and seller.

2.10 Review On Existing Electronic Marketing

(A) Amazon.com

URL: **http://www.amazon.com**

Amazon.com opened its virtual doors in July 1995 with a mission to use the Internet to transform book buying into the fastest, easiest, and most enjoyable shopping experience possible. Nowadays, they have Earth's Biggest Selection of products, including free electronic greeting cards, online auctions, and millions of books, CDs, videos, DVDs, toys and games, and electronics. [31]

Features:

- A searching engine for hundreds of product categories – customers can search and get what they want in a snap. All they need to know is one word related to the product they're looking for. If they can't remember an artist's name, Amazon can even show them all CDs featuring a certain song title!

- Given an instant personalized recommendations based on customers' prior purchases the moment they log on.

- Having a Special Occasion Reminder service for customers, and they'll never forget to get a gift for that special someone again.

- Provided a Help Desk, which can help customers when they ever have a question. They also can contact Amazon's 24-hour customer service department at orders@amazon.com.

Personal Evaluation:

- Amazon.com really provides a wide selection of products that can fulfill consumers' needs.

- Consumers can write a review or comment to them. They also can rate the product, which they like or don't like through the Amazon.com . This is the good way to let them give their feedback to Amazon.com .

- Consumers could browse along the aisle with a virtual shopping cart to collect products before executing the order. They also can add the product into a wish lists to let others know the things they would most like to own.

- Payment can be made with credit cards, cheque, postal or money order, purchase order or gift certificate securely.

- Consumers also can view they all of their orders and transactions within one year.

Lastly, I would like to say that Amazon.com definitely has a terrific site and provide a wonderful service.

(B) 18all.com

URL: **http://www.18all.com**

The most extensive on-line shopping site in Malaysia, with 8 main categories and over 110 sub-categories (growing all the time) of products. Products cover over 90 brands of goods and thousands of items. It provides a valuable, pleasant and reliable shopping experience and share information, which can enrich consumers. [32]

Feature:

- 18all.com supply customers a complete range of IT products, communications products, electrical products and corporate gifts

- 'Steve', is virtual products teacher, which is available to answer customers' questions. Customers can submit their questions or comments to 18all.com forum site and discuss their concerns with 'Steve'.

- 18all.com allows international orders. Customers have the choice of viewing prices of items that they sell in either Malaysian Ringgit (MYR) or US Dollar (USD). To toggle between the two simply click MYR or USD as required under 'Change Currency'

- 18all.com prepares the statistic about the top best sellers and a list of the new products in market.

Personal Evaluation:

- 18all.com offers a wide product range that covers everything consumers need from IT to homes appliances to mobile computing.

- Consumers can pay online, over the telephone or in person. They also have the option to pay by cash on delivery (COD) or credit card on delivery (CCOD) if they are in the Klang Valley or Penang.

- Ordering is simple and hassle free. Consumers can order online through their secure server. They use industry standard Secure Sockets Layer (SSL) encryption to protect consumers' credit card number from falling into the wrong hands.

- Consumers can recommend the product to their friend though the email function in 18all.com that may be interested in that item.

Lastly, I would like to say that the graphical user interface of 18all.com is relatively simple and easy to use.

(C) Sears.com

URL: **http://www.sears.com**

Sears.com where consumers can shop online for home appliances, small appliances and cookware, home electronics, fitness, computer or office equipment, tools, their lawn and garden needs, baby furniture or decor, and home services. [33]

Features:

- Sears.com has different kind of electronic advisor in different kind of products such as Appliance Advisor, BabyMe Advisor, Computers And Office Advisor, Home Electronics Advisor, Fitness Advisor, Lawn and Garden Advisor and Tools Advisor.

- A "Hot buys" is prepare by sears.com for displaying the products which are popular among customers and also products which are having special offer.

- Having a Great Gift Ideas service, which will suggest some alternatives to customers when they are planning to buy, presents.

- Giving out free order catalog, which include all kinds of products when customers apply it from sears.com .

Personal Evaluation:

- Consumers can review current and past orders online by clicking "Order Status". A list will display the date and status of all orders they've placed. They can also link to the UPS tracking system to check on UPS-shipped orders. Through that, consumers can know when is the time they will get the product.

- Sears.com only allows consumers to do their payment by using Sears Card, Sears Premier Card, Sears Commercial One, Sears Gold MasterCard, MasterCard, VISA, American Express, or Discover. There are some difficulties for those consumers who don't have such cards.

- When consumers selecting the certain product for viewing its product's summary, at the same time, sears.com will recommend other item like the one, which has been chosen. So, consumers will have many alternatives, which can let them doing the comparison between each item later.

- The design of the purchase process is quite simple, the consumers only have to fill in the particular information. This is saving time for them.

Lastly, I would like to say that sears.com giving consumers immediate shopping convenience.

2.11 Analysis Of Electronic Marketing System And The Existing System

After the review all the three electronic sales and marketing systems aver the Internet, a comparison between the proposed Electronic Marketing System and the examined systems is done. Each one of the three systems above has their own strengths and weaknesses. For example, the ability of providing product searching in the 18all.com and sears.com are not very user friendly. This is because the search function in this electronic commerce application only has a text field and a button without any list of choices. Consumers have to key in themselves when they want to search the product's categories.

The Electronic Marketing System will provide a product searching function with list of choice. Besides, it also will prepare the feature for purchase the products, feature for email to

friend purposely for recommendation, feature that allow consumers to rate the product and given their personal information. Furthermore, the proposed system is also included the backend activities which provide the features for the personnel to do the maintenance for the Web page, getting result of which product is most popular through the rating activity and generating sales report and consumers' information.

A good and user-friendly interface is a good point to be included into the design of the Electronic Marketing System. It will provide multimedia elements and Dynamic HTML (DHTML), which will help users to get more form the system.

2.12 Web Technologies

2.12.1 Web Clients And Servers

The client/server model has become one of the central ideas of network computing. Most business applications being written today use the client/server model. So does the Internet's main program, TCP/IP. In marketing, the term has been used to distinguish distributed computing by smaller dispersed computers from the "monolithic" centralized computing of mainframe computers. But this distinction has largely disappeared as mainframes and their applications have also turned to the client/server model and become part of network computing.

Relative to the Internet, your Web browser is a client program that requests services (the sending of Web pages or files) from a Web server (which technically is called a Hypertext Transport Protocol or Hypertext Transfer Protocol server) in another computer somewhere on the Internet. Similarly, your computer with TCP/IP installed allows you to make client requests for files from File Transfer Protocol (File Transfer Protocol) servers in other computers on the Internet.

For example, to check your bank account from your computer, a client program in your computer forwards your request to a server program at the bank. That program may in turn forward the request to its own client program that sends a request to a database server at another bank computer to retrieve your account balance. The balance is returned back to the bank data client, which in turn serves it back to the client in your personal computer, which displays the information for you. [6], [11]

2.12.1.1 Web Client / Server Architecture

Client /server architecture may be used on LANs, WANs, and so on the Web. The main characteristic that these three somewhat diverse uses share is a division of the workload between the server and the client. In each case, the client computers typically request services, including printing, information retrieval, and database access. The partner in these activities is the server, which is responsible for processing the client's requests. Nearly always, the client does very little work.

While the client's workload is light, the server's workload is not. Besides receiving and interpreting requests from the client, the server must locate information, reprocess it, and request initialization of resources supplied by other applications running on dedicated computers under the server's control. That workload-sharing arrangement is why servers generally must be beefy, expensive computers with lots of disk capacity, fault-tolerant processors, and ample memory.

In contrast to the server, clients require no more capability than is found on any ordinary personal computer. The term thin client is a popular description of a client's relatively low workload, compared with that of a server. Thin clients, who are diskless, are usually found on local area networks connected to the Internet. For electronic commerce applications, this translates to low-cost computers (client machines) for people wanting to purchase goods and services from a Web-hosted business. In this case, a Web business must shoulder larger costs to

purchase and run robust computers and software (servers) to serve a potentially large customer base. [6], [11]

2.12.1.2 Web Client /Server Communication

The division of labor between Web clients and Web servers is quite distinct. The Web client – your computer at the office or at home – requests information from a particular Web server on a distant computer. Using the Internet as the transportation medium, the request is formulated into an HTTP request and sent to the target computer – the server. A moment later, when the target server receives the request, it retrieves the page or other information that the server requested, formulates it as an HTML – formatted page, and sends it back to the requester client via the Internet. When the requested information, an HTML page in this instance, arrives at the client computer, the Web browser software determines that the information is an HTML page. It displays the page on the client machine according to the directions laid out in the page's HTML code. Repeatedly, this same general scenario is carried out as the client requests, the server obliges and responds, and the client displays the result. Sometimes, a simple client request results in dozens or even hundreds of separate server responses to locate and deliver information.

A Web page containing many graphics and other objects can be slow to display, because each element requires a separate request and response. This division of labor between client and server is fixed and well established. Neither the client nor the server can deviate from its assigned responsibilities. [6], [11]

2.12.1.3 Two – Tier Client / Server

A two – tier model involves only a client and server. All communication takes place between the client on the Internet and the target server at the other end. Of course, other computers are involved in the process of transporting packets of information across the Internet.

A two –tier architecture is one in which only a client (tier 1) and a server (tier 2) are involved in the requests and the responses that flow between them over the Internet. A typical request message from a client to a server consists of three major parts:

- A request line
- Optional request headers
- An optional entity body

The request line contains a command, the name of the target resource (without the protocol or domain name), and the protocol name and version. Following the request line are name/value pairs that comprise the request header, if exists. The request header contains additional information about the client and more information about the request. Finally, the optional entity body is sometimes used to pass bulk information to the server. A blank line separates the entity body from the request header information. TCP/IP is responsible for transporting the message safely and intact to the target severs.

Once the server receives the request, it executes the command (for example, it sends back to the client a particular Web page), retrieves a particular Web page from its trove of pages, and then formulates a properly formatted response to send back to the requesting client. A server's response consists of three parts that are identical in structure to a request message: a response header line, one or more response header fields, and an optional entity body. Here, though, each part has a slightly different function. The response header line indicates the HTTP version used by the server, the status of the response (found what you wanted, didn't find it at all, etc.), and an

explanation of the status information. Response header fields follow the response header line. A response header field returns information describing the server's attributes. The entity body returns the HTML page requested by the client machine. Though the entity body is optional, it is almost always present. [6]

2.12.1.4 Three – Tier Client / Server

A three – tier architecture builds on the traditional two – tier approach. The first tier is the client, running the graphical user interface (GUI), the second tier is the Web server, running the business logic, and the third tier consists of applications and their associated databases that supply non-HTML information to the Web server on request. From a software perspective, the three tiers are client processes (tier 1), Web services (tier 2), and data services (tier 3). Interactions between client and server operate the same way as they do in a two – tier architecture. The third tier provides comprehensive data services, including database operations supported by database software, enterprise resource planning software services, and other services needed to support a robust electronic commerce server.

A typical example of services supported by a database is a catalog with search, update, and display functions. Suppose that a user requests a display of your company's exotic fruit selections. The client request is formulated into an HTTP message, sent over the Internet to the server, and examined by the server. Analysis of the request reveals that the request requires the help of the server's database. The server sends a request to the database to search for, retrieve, and return all exotic fruit in the catalog. Database information flows back to the server, and the server formats the response into properly formed HTML and sends a message back to the client over the Internet.

Though the above is a very simplified explanation of the three – tier architecture, you can see why electronic commerce sites will require the third layer of hardware and software. The

additional software and support hardware are used to track customer purchases stored in shopping carts, look up sales tax rates, keep track of customer preferences, query inventory databases, and keep the company catalog current. [6]

2.12.1.5 Comparison Between Two –Tier And Three – Tier Client / Server

	Two – Tier Client / Server	Three – Tier Client / Server
System administration	Complex (more logic on the client to manage)	Less complex (the application can be centrally managed on the server – application programs are made visible to standard system management tools)
Security	Low (data-level security)	High (fine-tuned at the service or method level)
Encapsulation of data	Low (data tables are exposed)	High (the client invokes services or methods)
Performance	Poor (many SQL statements are sent over the network; selected data must be downloaded for analysis on the client)	Good (only service requests and responses are sent between the client and server)

	Two – Tier Client / Server	Three – Tier Client / Server
Scale	Poor (limited management of client communications links)	Excellent (concentrates incoming sessions; can distribute loads across multiple servers)
Application reuse	Poor (monolithic application on client)	Excellent (can reuse services and objects)
Ease of development	High	Getting better (standard tools can be used to create the clients, and tools are emerging that you can use to develop both the client and server sides of the application)
Server-to server infrastructure	No	Yes (via server-side middleware)
Legacy application integration	No	Yes (via gateway encapsulated by services or objects)
Internet support	Poor (Internet bandwidth limitations make it harder to download fat clients and exacerbate the already noted limitations)	Excellent (thin client are easier to download as applets or beans; remote services invocations distribute the application load to the server)
Heterogeneous database support	No	Yes (3-tier applications can use multiple databases within the same business transaction)

	Two – Tier Client / Server	Three – Tier Client / Server
Rich communication choices	No (only synchronous, connection-oriented RPC-like calls)	Yes (supports RPC-like calls, but can also support connectionless messaging, queued delivery, publish-and-subscribe,and broadcast)
Hardware architecture flexibility	Limited (you have a client and a server)	Excellent (all three tiers may reside on different computers, or the second and third tiers may both reside on the same computer; with component-based environments, you can distribute the second tier across multiple servers as well)
Availability	Poor (can't fail over to a backup server)	Excellent (can restart the middle tier components other servers)

Table 2.1: Comparison Between Two –Tier And Three – Tier Client / Server

2.12.2 Web Development Technology

2.12.2.1 Common Gateway Interface

The common gateway interface (CGI) is a standard way for a Web server to pass a Web user's request to an application program and to receive data back to forward to the user. When the user requests a Web page (for example, by clicking on a highlighted word or entering a Web

site address), the server sends back the requested page. However, when a user fills out a form on a Web page and sends it in, it usually needs to be processed by an application program. The Web server typically passes the form information to a small application program that processes the data and may send back a confirmation message. This method or convention for passing data back and forth between the server and the application is called the common gateway interface (CGI). It is part of the Web's Hypertext Transfer Protocol (HTTP).

The common gateway interface provides a consistent way for data to be passed from the user's request to the application program and back to the user. This means that the person who writes the application program can makes sure it gets used no matter which operating system the server uses (PC, Macintosh, UNIX, OS/390, or others). It's simply a basic way for information to be passed from the Web server about your request to the application program and back again.

Any script can be called a CGI script as long as it is installed on the server end. The majority of CGI scripts are written in Perl, with C or C++ and Java being the next most common. CGI is installed on the server end that makes it able to do things such as submit a form, create a guest book or forum, keep track of and rotate advertisements, and much more.

The server also has the capability to redirect data to any email address, persist data, dynamically serve out different content to the browser, among many other things that the browser alone simply cannot do. [34], [35], [36]

2.12.2.2 Active Server Pages

With the advancement of CGI and its ability to output dynamic information, comes another similar technology called ASP. Active Server Pages is an open compile-free application environment in which you can combine HTML scripts and reusable ActiveX server components to create dynamic and powerful Web-based business solutions. Active Server Pages enables

server side scripting for Internet Information Server (IIS) with native support for both VBScript and Jscript.

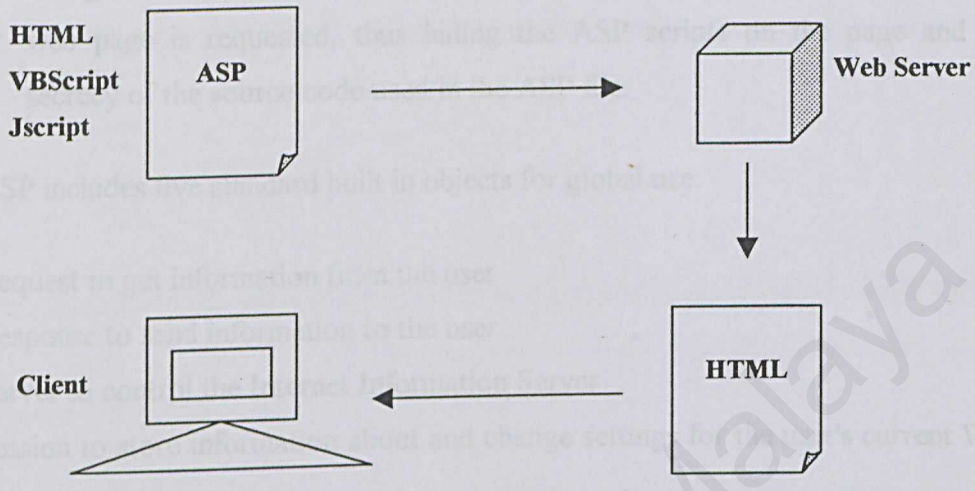


Figure 2.6: Illustrates How The Web Server Interprets ASP Files

When a browser requests an ASP file from the server, it is passed on to the ASP processing DLL (Dynamic Link Libraries) for execution. After processing, the resulting file is then sent on to the requesting browser. The magic of ASP is that it does not matter which browser is used to view the ASP file, because the server returns only pure HTML. Any scripting commands embedded from original HTML file are executed and then removed from the results, which is excellent for the web developer because all the scripting code is hidden from the person viewing the web page. This phenomenon can be explained by the ".asp" extension that is used by all ASP files.

ASP pages have an ".asp" extension instead of the usual ".html" and ".htm" that most HTML files have. It is imperative that ASP files carry the ".asp" extension for two reasons.

(i) In order to let the web server know to process the scripting in the web pages, it needs to know that there is some scripts in there. By setting the extension of the web page to ".asp", the server will assume that there are scripts in the page.

(ii) Using an ".asp" extension forces interpretation by the ASP processor every time the web page is requested, thus hiding the ASP scripts on the page and maintaining secrecy of the source code used in the ASP file.

ASP includes five standard built in objects for global use:

- Request to get information from the user
- Response to send information to the user
- Server to control the Internet Information Server
- Session to store information about and change settings for the user's current Web-server session
- Application to share application-level information and control settings for the lifetime of the application

Microsoft recommends the use of the server-side ASP rather than a client-side script, where there is actually a choice, because the server-side script will result in an easily displayable HTML page. Client-side scripts (for example, with JavaScript) may not work as intended on older browsers. [12], [37], [38]

2.12.2.3 Objects vs. Components

Object-oriented programming (OOP) is based on the idea that real world entities or relationships can be represented in code as objects. These code objects have associated with their data and behave in certain ways when asked to. Objects can be linked together to form programs and applications. The strength of objects lies in its ability to be reused over and over again.

However, objects are created from classes, and classes are made up of source codes, which are language-specific. Thus, objects can only be used in one environment. Building on the idea of object-oriented programming, comes component-oriented design, which facilitates even better reuse of objects. Components are precompiled units of binary code, thus they are language-independent. A component may consist of one object or a collection of objects. [39]

2.12.2.4 Component Object Model

The Component Object Model (COM) is Microsoft's standard for allowing objects and components to interact irrespective of the language in which the components were first built. It is a binary programming standard.

Combining the two higher level programming models, Object based and Distributed computing, a new super high level COM programming model has evolved. Object oriented software has solved numerous software industry challenges like reuse and productivity. Distributed computing architectures like parallel processing, master/slave, peer to peer, client/server, etc., have alleviated the problems with monolithic software. By combining some of the finest features of these two techniques, the COM standard enforces and enables the engineers to build reusable binary compatible software. [40], [41]

Some of the advantages of the Component Object Model are:

- **Location Transparency**. The component's clients don't have to know the location of the components. The client software can be sitting on a lion's computer in the deepest jungle in Africa, whereas the server components can be on a host machine with the arctic bears.

- **Wire Level Standard**. The component users don't have to know anything about the underlying network mechanisms, TCP/IP or NETBIOS, to use the components. They

don't have to understand or learn anything about network programming. The COM library takes care of it for you.

- **Binary Standard**. The users don't have to know about the programming languages – C, B, VB, Java, Tea – used to build the components. Regardless of what language you use to build the components and objects, it works. So, your company can have programmers with different programming skills. Also, the users don't have to bother about whether the programming tools – Borland C++, Visual Basic, Symantec C++, compilers, linkers, interpreters - were sold by Microsoft or Symantec or Borland. The client and server components can be developed with different tools, and they will all interact properly as long as they adhere to the COM programming model.

- **Runtime Polymorphism**. At runtime the client detects the right component it wants and uses its services. This means you don't have to recompile your client every time you make a change to your server. The components don't mutate. Once, you release a component, if you want to make a change then you release a new component. If the client wants the new services, only then you have to modify your client.

2.12.2.5 Active X

ActiveX is the name Microsoft has given to a set of "strategic" object-oriented programming technologies and tools. In other words, ActiveX encompasses a set of technologies that each defines the interface between software components to implement some type of functionality.

The main technology is the Component Object Model (COM). Used in a network with a directory and additional support, COM becomes the Distributed Component Object Model (DCOM). The main thing that you create when writing a program to run in the ActiveX environment is a component, a self-sufficient program that can be run anywhere in your ActiveX network (currently a network consisting of Windows and Macintosh systems). This component is known as an ActiveX control. ActiveX is Microsoft's answer to the Java technology from Sun Microsystems. An ActiveX control is roughly equivalent to a Java applet.

An ActiveX component, on the other hand, is an application that stands alone and let other applications use the classes and objects it contains. ActiveX components are often implemented as Active DLLs (Dynamic Link Libraries). DLLs do not have their own interfaces and depend on other applications to call on it. Several programming tools may be used to build Active DLLs, with Microsoft Visual Basic 6.0 being the preferred choice by developers all around the world. [42]

2.12.2.6 Active Scripting

ASP paged is able access ActiveX components through a technology called Active Scripting. Active Scripting is a reusable scripting engine that is capable of supporting many languages by allowing developers to write supporting language plug-ins. It can be found in use in ASP files and Window Script Host (WSH) Active Scripting is shipped with VBScript (a cut down version of VB) and JavaScript. Active Scripting is used in Microsoft Internet Explorer and in Microsoft Internet Information Server.

2.12.3 Operating System

2.12.3.1 Linux

Linux is a complete operating system that is similar, but not identical to UNIX. It supports both 32 and 64 bit hardware and provides a stable multi-user Internet ready operating system. It was initially created by a young student, Linux Torvalds, at the University of Helsinki in Finland as a hobby. Originally the term Linux referred strictly to the kernel (the care of the operating system), but the phrase itself refers nowadays to a collection of configured software that runs on the top of the Linux kernel.

The source code for Linux is freely available to everyone. Freely available in this context means the source code for the kernel and most software cannot be withheld. This however, does not mean that Linux and its assorted distributions are free. Companies and developers may charge money for it as long as the source code remains available. Among the companies involved in the distribution of Linux are Red Hat, Caldera, S.U.S.E., and Stampede. These companies do not just compile and configure the software. Caldera, Red Hat and others have added their own proprietary software to their distribution.

Linux is used for a wide variety of purposes including networking, software development, and as an end-user platform. Linux is often considered as an excellent low cost alternative to other more expensive operating system. It is stable in the sense that, crashes of applications in Linux are much less likely to bring down the entire operating system as compared to Windows. Linux servers are also reliable, as they are often up for hundreds of days before requiring any reboots.

Linux uses internet and industry standard components and protocols giving a system with complete network integration. The operating system can act as a server for most major file serving protocols, and provide all the major internet applications. The X window system

provides a networked and platform independent graphical interface that (unlike proprietary user interfaces) allows one desktop to access applications running on multiple machines across local and wide area networks. [43], [44], [45]

2.12.3.2 Windows 98

One of the products in Microsoft's evolution of the Windows operating system for personal computer is Windows 98. An important of the user interface of Windows 98 is the Web technology and it was released with its tightly integrated browser. Microsoft Internet Explorer is an integral part of the operating system in the Windows 98. Users can view and access desktop objects that reside on the World Wide Web as well as local files and application using the Active Desktop of Windows 98. In fact, Windows 98 desktop is a Web page with HTML links and features that exploit Microsoft's ActiveX controls.

It also provides a 32-bit file allocation table (FAT32) that allowing a single-partition disk drive larger than 2Gbytes. The other features in Windows 98 includes supports for Universal Serial Bus (USB), which make it easy to plug in new devices support for Digital Versatile Disc (DVD), support for a new industry standard form of power management called Advanced Configuration and Power Interface (ACPI).

Windows 98 enables the news and other content to be set up and pushed to the user from specified Web sites. When using it as Web server, Personal Web Server (PWS) need to be installed in order for the Windows system to serve Web pages through Internet. [46], [47]

2.12.3.3 Windows NT

Windows NT is the operating system for personal computer created for users and business requiring advanced capability. It is actually comprise of two products: Microsoft NT Workstation and Microsoft NT Server. The workstation is a little more safe than Windows 98 and Windows 95. It is designed for users especially business users, who need faster performance. The server is designed for business machines that need to provide services for LAN-attached computers. Together with an Internet server such as Microsoft's Internet Information Server (IIS), it is required for a Windows system that plans to serve Web pages. The latest version, the Windows NT Server version 5.0 is now available, called Windows 2000.

Just like its desktop siblings (Windows 95/98), Windows NT is easy to use, fairly quick to learn, and has some great software bundled with it. It also comes with a colorful interface, with plenty of icons to assist users in navigating themselves through the system. There is no need for users to memorize difficult commands, as almost everything or anything on the Windows NT is done by simple clicks of the mouse. The, by far, makes Windows NT (also Windows 95/98) the most user-friendly operating system available in the world today.

Windows NT is also preferred above many other operating system because of its ability to inter-operate with a variety of enterprise level software available in the market today. In other words, there are much more software designed to run especially on the Windows platform as compared to any other operating system in the world today. NT's improved system architecture also makes it far more superior than its desktop siblings, Windows 95/98, which makes it a better choice for business applications. [48]

2.12.3.4 Windows 2000

The latest version of Microsoft's evolving Windows operating system is Windows 2000. Before that, it is called Windows NT 5.0. Microsoft emphasizes that Windows 2000 is

evolutionary and is built on NT technology. Most users of Windows 98 and Windows NT will in time move to Windows 2000. It is designed to appeal to small business and professional users as well as to more technical and larger business market for which the NT was designed. [49], [50]

The Windows 2000 product line consists of four products:

- **Windows 2000 Professional**, aimed at individuals and businesses of all sizes. It includes security and mobile use enhancements. It is the most economical choice.

- **Windows 2000 Server**, aimed at small-to-medium size businesses. It can function as a Web server and/or a workgroup (or branch office) server. It can be part of a two-way symmetric multiprocessing system. NT 4.0 servers can be upgraded to this server.

- **Windows 2000 Advanced Server**, aimed at being a network operating system server and/or an application server, including those involving large databases. This server facilitates *clustering* and *load-balancing*. NT 4.0 servers with up to eight-way SMP can upgrade to this product.

- **Windows 2000 Datacenter Server**, designed for large data warehouses, online transaction processing (OLTP), econometric analysis, and other applications requiring high-speed computation and large databases. The Datacenter Server supports up to 16-way SMP and up to 64 gigabytes of physical memory.

It was reported in earlier reviews that Windows 2000 is more stable that Windows 98/NT systems. It is less likely to clash. A significant new feature is Microsoft's Active Directory that

enables virtual private networks to be set up by a company, data locally or on the network to be encrypted, and to give users access to shared files in a consistent way any network computer.

The other features of the Windows 2000 are it has a fully customizable administrative console that can be based on tasks rather than files, applications, or users. Also Dynamic Domain Name Server (DNS), which replicates changes in the network using the Active Directory Services, the Dynamic Host Configuration Protocol (DHCP), and the Windows Internet Naming Service (WINS) whenever a client is reconfigured.

Besides that, it also has the ability to create, extend, or mirror a disk volume without having to shut down the system and to back up data to a variety of magnetic and optical storage media. In addition, it also has close integration with and supports for Microsoft's Message Queue Server, Transaction Server, and Internet Information Server (IIS).

2.12.4 Web Server

2.12.4.1 Apache Server

The Apache server is a powerful, flexible, HTTP 1.1 compliant Web Server. It is highly configurable and extensible with third-party modules. It provides full source code and comes with an unrestrictive license. It runs on Windows NT/9x, OS/2 and most version of Unix, as well as several other operating systems. Apache has a built-in search engine and HTML authoring tools and supports File Transfer Protocol (FTP). Apache is actively being developed and encourages user feedback through new ideas, bug reports and patches.

The Apache server allows administrators to easily set up password-protected pages with enormous numbers of authorized users, without slowing down the server. It also permits administrators to set up customized files, or even CGI scripts, which are returned by the server in

response to errors and problems. This allows the administrator to perform on-the-fly diagnostics for both users and administrator.

Apache is also flexible enough to perform multiple Directory Index directives, where administrators can instruct the server to either send back index .html or run index .cgi when a directory URL is requested, which ever it finds in the directory. Those come running Apache servers will also find that it has unlimited flexible URL rewriting and aliasing. Apache has no fixed limit on the numbers of Aliases and Redirects that may be declared in its configuration files. In additional, a powerful rewriting engine can be used to solve most URL manipulation problems.

Today the Apache server is the most widely implemented Wed server on the Internet. It offers a powerful and customizable approach for any Unix-based server. It has been shown to be substantially faster, more stable and more feature-full than many other Web servers, including IIS. Apache is run on sites that get millions of hits per day and they have yet experienced any performance difficulties. [6], [51], [52]

2.12.4.2 Internet Information Server

Internet Information Server (IIS) is a group of Internet servers (including a Web or Hypertext Transfer Protocol server and a File Transfer Protocol server) with additional capabilities for Microsoft's Windows NT and Windows 2000 Server operating systems. IIS is Microsoft's entry to compete in the Internet server market that is also addressed by Apache, Sun Microsystems, O'Reilly, and others.

IIS comes with three default services: WWW, FTP and Gopher. Its Internet Service Manager (ISM) application controls these services on this or any other IIS server on the network. ISM is run from the Window NT Server or from a Windows NT or Windows 95/98 workstation.

For remote administration, ISM can be run from any browsers using on HTML version. IIS supports FTP, allowing users to download files and data from the IIS server site with the FTP protocol.

With IIS, Microsoft includes a set of programs for building and administering Web sites, a search engine that allows users to create custom search forms with a variety of tools, including ASP, ActiveX Data Objects, and SQL database queries, reporting tools from Crystal reports. (Crystal Reports is a visual reporting tool that lets you create presentation-quality reports and integrate them into database applications.), and support for writing Web-based applications that access databases. Microsoft points out that IIS is tightly integrated with the Windows NT and 2000 Servers in a number of ways, resulting in faster Web page serving.

A typical company that buys IIS can create pages for Web sites using Microsoft's Front Page product (with its WYSIWYG user interface). Web developers can use Microsoft's Active Server Page (ASP)technology, which means that applications - including ActiveX controls - can be imbedded in Web pages that modify the content sent back to users. Developers can also write programs that filter requests and get the correct Web pages for different users by using Microsoft's Internet Server Application Program Interface (ISAPI) interface.

To tap into the power of ASP and server-side scripting, IIS includes native scripting engines for VBScript and JavaScript. Server plug-ins is available for other scripting languages such as Perl, TCL, and REXX. You can even use several different scripting languages within a single ASP document.

Database access has also been extended in IIS. ActiveX Data Objects (ADO), an ASP component, lets developers access and control data in any ODBC- or OLEDB-compliant database using any ActiveX scripting language. Developers can put a Web front end on almost any legacy database without arcane CGI programming.

IIS includes security features and promises that it is easy to install. It works closely with the Microsoft Transaction Server to access databases and provide control at the transaction level. It also works with Microsoft's Netshow in the delivery of streaming audio and video, delayed or live. [6], [53], [54]

2.12.5 Web Authoring Tools

2.12.5.1 Microsoft Visual Interdev 6.0

Visual Interdev is an integrated development environment (IDE) for creating dynamic web sites. It is part of the Microsoft Visual Studio family, which consists of Visual Basic, Visual C++, Visual FoxPro, and Visual J++. Visual Interdev combines a number of tools into a single package to simplify development chores. There is support for project management, syntax highlighting of different types of web files such as ASP or HTML, automatic synchronization of local files with web server files, and integrated databases access.

With Visual Interdev, a developer can assemble pages that use Microsoft's ActiveX technologies and other similar com technologies. Data driven web applications can also be developed using Microsoft's Universal Data Access, which includes ADO (ActiveX Data Objects), ODBC (Open Database Connectivity), and OLEDB. Visual Interdev also provides a robust development environment with a Scripting Object Model, design time control (DCTs), and a extensible toolbox for the purpose of rapid design, testing, and debugging of web pages. Web teams can now develop pages in isolation and maintain ready access to a master version. In short, Visual Interdev is an excellent all-rounder IDE, both for programmers and non-programmers. [55], [56], [57]

2.12.5.2 Microsoft FrontPage 2000

FrontPage 2000 is part of the Microsoft Office 2000 family. It runs on the Windows 95/98/NT/2000 operating system, and is one of the simplest and least complex HTML editors available in the market today. Because FrontPage 2000 is integrated into the Office 2000 package, it interacts easily with other components of Office 2000, such as Word, Excel, Access and Power Point.

FrontPage 2000 is aimed at letting non-programmers build no-nonsense pages for their web sites quickly and easily. It features built-in tools to facilitate the creation of forms, tables, banners, Java Applets, and much more. Developers, writers and designers may also work on the same web project by using Microsoft FrontPage and Microsoft Visual Interdev in conjunction. In this case, Visual Interdev provides developers with a robust set of tools for developing web applications, while FrontPage provides a WYSIWYG environment for editing pages that does not require any programming knowledge. [58], [59], [60]

2.12.5.3 Allaire Cold Fusion 4.0

Cold Fusion is a complete development and deployment environment ideally suited for building today's web-based e-commerce, content management, and business-automation initiatives. It is an ideal choice for workgroup, departmental and extranet applications, in which fast deployment times are critical, often with the work done by less-experienced developers.

Cold Fusion applications are essentially collections of pages. As with static web pages, Cold Fusion pages can contain HTML and other client technologies, such as JavaScript or PearScript. Unlike static pages, Cold Fusion application pages are denoted by a specific ".cfm" extension, which is the default Cold Fusion file extension. Cold Fusion pages also contain an

additional language, called the Cold Fusion Markup Language (CFML). CFML encompasses the Web's Hypertext Markup Language HTML and Extensible Markup Language (XML).

The Cold Fusion development platform consists of two basic components:

(i) Cold Fusion Server

The Cold Fusion Server is a high-performance web application server for deploying browser-based applications. It offers all the runtime services for delivering e-business applications built on a highly scalable and open architecture. Because CFML is processed on the server, and because web servers only know how to pass pages to browsers, the Cold Fusion Server must be installed on a web server to provide support for Cold Fusion applications. When the Cold Fusion Server is installed on a web server and a client requests a page with a ".cfm" extension, the following steps take place:

1. The web server passes files to Cold Fusion Server
2. Cold Fusion Server scans the page and processes all CFML tags.
3. Cold Fusion Server returns only HTML and other client-side technologies to the web server and, in turn, the browser.

(ii) Cold Fusion Studio

Cold Fusion Studio is an integrated development environment (IDE) that includes a variety of tools for building web applications. It provides a full suite of advanced editing tools including color coding, web application wizards, and two way visual programming. Cold Fusion Studio also includes visual database tools, and interactive debugger, full integration with source control systems, and support for remote and team development using the Cold Fusion Server.

Using the Cold Fusion development platform, developers can build web applications that connect to a wide range of existing business systems, such as RDBMS, messaging servers, file

repositories, directory servers, and distributed object middleware. All the above make Cold Fusion an excellent tool for heavy-duty web development. [61], [62], [63]

2.12.5.4 Macromedia Dreamweaver 3.0

Macromedia Dreamweaver is a professional visual HTML editor for creating and managing Web sites and pages. It gives developers the productivity of a visual Web page layout tool, the control of an HTML text editor, and support for new Web technologies, all in one software package.

Developers can use Dreamweaver to create Web sites visually, with confidence that the HTML being generated is concise and always editable. Dreamweaver includes advanced features that take advantage of the latest innovations on the Web, such as Dynamic HTML and Cascading Style Sheets, while still ensuring that Web pages work well in a variety of Web browsers. All of the code generated by Dreamweaver is carefully created to work on as many platforms and browsers as possible.

Other features of Dreamweaver include the easy integration of ActiveX components, java applets and plug-in for improved Web page interactivity. Dreamweaver also integrates seamlessly with the other components of Macromedia, such as Flash Movies, Shack ware and Fireworks, which are essential for the development of interactive Web pages. [64], [65], [66], [67]

2.12.6Scripting Language

2.12.6.1 Visual Basic Script

VBScript, or by its full name, the Microsoft Visual Basic Scripting Edition Language, is a simplified version of the Visual Basic and Visual Basic for Applications family of programming languages. It is closely related to the BASIC programming language. While it does not offer the functionality of Visual Basic, it does provide a powerful, easy to learn tool that can be used to add interaction to Web pages.

VBScript is a scripting language, or more precisely a scripting environment, which can enhance HTML Web pages by making them active, as compared to a simple static display. It is the default language of ASP and is event-driven. VBScript provides a small but sufficient set of error handling capabilities. Handling multi-dimensional arrays in VBScript is also a breeze. VBScript arrays can easily be dimensioned and re-dimensioned, as required by the developer.

VBScript talks to host applications using ActiveX Scripting. With ActiveX Scripting, browsers and other host applications don't require special integration code for each scripting component. ActiveX Scripting enables a host to compile scripts, obtain and call entry points, and manage the namespace available to the developer. With ActiveX Scripting, language vendors can create standard language run times for scripting. Microsoft will provide run-time support for VBScript. Microsoft is working with various Internet groups to define the ActiveX Scripting standard so that scripting engines can be interchangeable.

Specifically, VBScript was created by Microsoft to use either as a client-side scripting language for the Microsoft Internet Explorer (version 3.0 and later), or as a server-side scripting language with the Microsoft Internet Information Server (version 3.0 and later). However, VBScript is more often used as a server-side scripting language because of its potent processing capabilities on the server-side. [68], [69]

2.12.6.2 JavaScript

JavaScript is a platform-independent, event-driven, interpreted programming language developed by the Netscape Communications Corporation and Sun Microsystems. Originally called Live Script (and still called Live Wire by Netscape). JavaScript is affiliated with Sun's object-oriented programming language Java primarily as a marketing convenience. They interoperate well but are technically, functionally and behaviorally very different. A popular misconception about JavaScript is that many people believe that JavaScript is Java because of their similar names. This is definitely not true as JavaScript is not Java.

User can develop server applications or client applications with Java Script. The term "server" is referring to the computer where the Web page resides. The term "client" is referring to the browser application that loads and displays Web page. Java Script is an extension to HTML that lets users create more sophisticated Web pages than they ever could with HTML alone.

The Netscape Navigator 2.01 and its later releases support Java Script. There are several version of Java Script supported by certain browsers and browser version. Unfortunately, this can often lead to confusion in compatibilities. Since Netscape originally introduced Java Script, Java Script 1.0 was the language specification supported in Netscape Navigator 2.0. Subsequently, Navigator 3.0 supported new enhancements that comprised Java Script 1.1. At present, Navigator 4.0 support Java Script 1.2.

Java Script offers much more expressive power that HTML alone. Java Script can do thing such as create multipart documents, build dynamic documents that take users through a Web site from one document to another, and generate documents that interact with the user. [70], [71], [72]

2.12.6.3 Perl / PerlScript

Perl (Practical Extraction and Reporting Language) is a script programming language that is similar in syntax to the C language and that includes a number of popular UNIX facilities such as sed, awk, and tr. Perl is an interpreted language that can optionally be compiled just before execution into either C code or cross-platform byte code. When compiled, a Perl program is almost (but not quite) as fast as a fully precompiled C language program. Perl is regarded as a good choice for developing common gateway interface (CGI) programs because it has good text manipulation facilities (although it also handles binary files). Larry Wall invented it.

In general, Perl is easier to learn and faster to code in than the more structured C and C++ languages. Perl programs can, however, be quite sophisticated. Perl tends to have devoted adherents.

Plug-ins can be installed for some servers (Apache, for example) so that Perl is loaded permanently in memory, thus reducing compile time and resulting in faster execution of CGI Perl scripts. [73], [74], [75]

2.12.6.4 PHP

PHP (officially "PHP: Hypertext Preprocessor") is a server-side HTML embedded scripting language. PHP codes are executed on the server. This means the client would receive the results of running that script, with no way of determining what the underlying code may be. The Web server can even be configured to process all HTML files with PHP, and there is no way that users can tell that the HTML file was written in PHP.

Rasmus Lerdorf first conceived PHP sometimes in the fall of 1994. Early non-released versions were used on his home page to keep track of who was looking at his online resume. The

first version used by others was available sometime in early 1995 and was known as the Personal Home Page (PHP) Tools. It consisted of a very simplistic parser engine that only understood a few special macros and a number of utilities that were in common use on home pages back then. The parser was rewritten in mid-1995 and named PHP/FI. Version 2. The FI (Form Interpreter) came from another package Rasmus had written interpreted html form data. He combined the Personal Home Page tools scripts with the FI, and added Microsoft SQL support and PHP/FI was born. PHP/FI grew at an amazing pace and people started contributing code to it. Today, PHP ships with a number of commercial products, with Red Hat Linux being one of them.

PHP is different from a CGI script written in other languages like Perl of C. Instead of writing a program with many commands to output HTML, the programmer writes on HTML script with some embedded code to output text instead. However, PHP can do anything any other CGI program can do, such as collect form data, generate dynamic page content, or send and receive cookies. Perhaps the strongest and most significant feature in PHP is its support for a wide ranges of databases writing a database enabled Web page is, therefore, incredibly simple with PHP.

Developers have literally flocked to PHP, with its modest learning curve, free and open development, native database connectivity, stability and availability for a variety of platforms. PHP's primary strength is in its rapid development of dynamic Web pages. Developers without heavy programming experience can leverage PHP to complete tasks otherwise cryptic or obtuse in alternative languages. The architecture of the PHP language is simple but powerful, and includes an extremely wide variety of functions suited for many tasks, both traditional data processing tasks and more Web-oriented functions as well. [76], [77]

2.12.6.5 Cold Fusion Markup Language

CFML or Cold Fusion Markup Language is a set of special tags that are typically placed inside HTML pages and interpreted by the Cold Fusion Server. The tags perform such tasks as database connectivity and conditional logic, but they also handler other needs of the Web developer.

This server-side scripting language contains more than 70 tags for database connectivity, conditional logic, input and output, and integration with other Internet and file services. Over 200 additional functions handle items such as date and time, mathematical functions, and string manipulations. For database connectivity, SQL statements are embedded into Web pages by using CFML shortcuts, such as CFFORM and CFTABLE, which add functionality to HTML forms and simplify HTML tables, respectively. Additionally, CFML is extensible and it seamlessly integrates with major distributed objects standards such as COM and COBRA.

CFML files must be processed on the Cold Fusion server each time an application page is requested. As such, Web server will need to be installed with the Cold Fusion Server first before any CFML files could be processed. Despite the limitations, CFML still provides a dynamic application environment that is powerful and easy to use. [78], [79]

2.12.7 Database

2.12.7.1 Microsoft Access 2000

Microsoft Access 2000 is a Window-based database management system. It is a member of the Microsoft Office 2000 family and it runs under the Windows 95/98/NT/2000 operating system. Due to the fact that Access is part of the Office 2000 suite, it interoperates well with the other components of the Office 2000 family.

Access is easily the world's most popular relational database management software (RDBMS). Access 2000 brings not only the traditional broad range of easy data management tools but also adds increased integration with the Web for easier sharing of data across a variety of platforms and user levels and additional ease-of-use enhancements to assist with personal productivity. With Access, the database administrator can design and use databases very quickly, as it has a very user-friendly interface. Also, Stat/Transfer can be used to convert data between Microsoft Access and your favorite spreadsheet, database or statistical package. Besides that, data in Microsoft Access can be migrated to the Microsoft SQL Server.

Access 2000 continues to offer an easy-to-use tool for easily finding information that provides consistency and integration with the other applications in the office suite. It also allows easily sharing information via the corporate Intranet and the ability to easily host a database within the browser. This combines the power of a desktop database with the power of the Web. Furthermore, tables, forms, queries, and reports can be generated just at a snap of a finger, just by using the set of wizards that come with this software. All this makes Access an excellent all-in-one database tool for creating standalone database applications. [13], [80]

2.12.7.2 Microsoft SQL Server 7.0

Microsoft SQL Server 7.0 is a modern, full-featured SQL database designed for small or midsize organizations. Its complete set of tools, high-end engine features, and robust analysis capabilities provide most of what other corporations could offer only in their Enterprise Edition databases, all at a reasonable price. In addition, SQL Server 7.0 is a amazingly easy to use, yet still powerful enough to crank through hundreds of complex transactions per second without choking. Customer needs and requirements have driven significant product innovations in ease of use, reliability and scalability and data warehousing. SQL Server 7.0 runs on Windows NT 4.0 or Windows 2000.

Many engine settings in SQL Server 7.0 are self-tuning. Developers need not assign memory to the data cache or store procedure cache separately. SQL Server dynamically balances memory between the two. SQL Server expands or contracts the amount of memory it is using as a whole. It can automatically make room in memory for other applications when they are running, expand again to fill extra memory when the applications are closed down.

Automatic memory tuning is not especially important on a dedicated database server machine. But on a server that has to run other applications like a mail server and Web server at the same time as a database, dynamic memory sizing makes a huge different to system usability. SQL server's unmatched auto-tuning features also mean that it is extremely suitable for organizations that do not have database administrators on staff. With SQL Server 7.0, a part time or beginner administrator is all it takes to manage the database effectively.

SQL Server is a client/server relational database management system (RDBMS) that is highly integrated with the Windows NT operating system. By using SQL Server, modern application can be developed that separate the client application and the database service. SQL Server Transact-SQL supports the ANSI-92 standard and provides extensions to the SQL language.

Microsoft SQL Server supports a set of features that result in the following benefits:

- **Ease of installation, deployment and use**
  SQL Server includes a set of administrative and development tools that improve your ability to install, deploy, manage and use SQL Server across several sites.

- **Scalability**
  The same database engine can be used across platforms ranging from laptop computers running Microsoft Windows 95/98 to large, multiprocessor server running Microsoft Windows NT, Enterprise Editor.

- **Data warehousing**
  SQL Server includes tools foe extracting and analyzing summary data for Online Analytical Processing (OLAP). SQL Server also includes tools for visually designing database and analyzing data using English-based questions.

- **System integration with other server software**
  SQL Server integrates with e-mail, the Internet and Windows.

Database is the choice for e-commerce sites and best of breed data warehousing solutions. SQL Server includes OLAP Services, Data Transformation Services and English Query, and works with over 45 ISVs that form Data Warehousing Alliance. First database to scale from the laptop to the enterprise using the same code base, offering 100% code compatibility. By using Windows 2000, fastest database for SAP, based on the SAP Retail benchmark. [81], [82]

2.13 Summary

Literature review is a crucial part in a system development cycle. Through that, I manage to gather many ideas, information and knowledge for me to develop the Electronic Marketing. I get a better understanding on which development tools and development methodologies are suitable for developing Electronic Marketing. Besides, I also able to do comparison on the past-developed projects and study the strength and weakness of them. These have give me an overview of how to improve the weakness and fulfill the requirements needed.

CHAPTER THREE

Methodology And System Analysis

Chapter 3: Methodology And System Analysis

3.1 Introduction

After the literature search and review, the next step is to perform a detailed analysis. The main purpose of the system analysis phase is to learn exactly what takes place in the current system, and to determine and fully document in detail what should take place. The result of this process will be used to recommend improvement to the system.

Through system analysis, the programmer may add, delete and modify system components toward the goal of improving the overall system. The information gathered during this phase has provided alternative strategies to develop this system. Although software design can be identified and defined as a distinct activity, it must be compatible in both concept and implementation with essential development activities such as analysis and coding that precede or follow it. Through this phase also, the programmer can determine types of functional requirements and non-functional requirements for the system.

3.2 Objectives Of System Analysis

Following are some of the objectives of the analysis:

- To determine type of methodology to be used.
- To study the problem faced by the user.
- To study the problem and find out the best solution to reduced it.
- To acquire knowledge on how this system will be developed with the new emerging technology.
- To choose the development tools for the new system among different types of tools that have been studied in Chapter 2.

- To identify the major modules to be included in the system.
- To identify what are the modules that are feasible to develop and the knowledge and tools need to have in order to develop them.

3.3 System Development Methodology

The methodology used in the development of Electronic Marketing System is the Waterfall model. As the name implies, the stages of development cascades from one phase to another. Each stage of a development is required to be completed before proceeding to the next phase. The Waterfall model offers the benefit of a structured development, in addition to good visibility and proper documentation for each development stage. Figure 3.1 shows the stages included in the model. [14], [15]

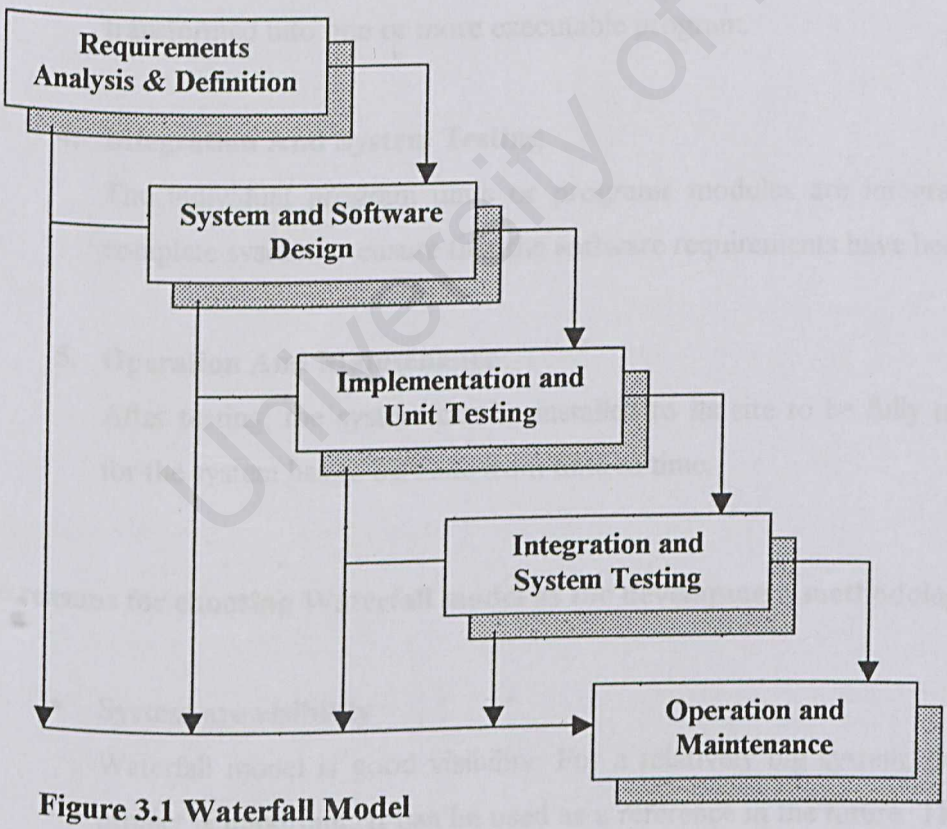


Figure 3.1 Waterfall Model

The 5 stages of the Waterfall Model are discussed below:

1. **Requirement Analysis And Definition**

   The concept, purpose and functionality of Electronic Marketing System are identified and defined. During this stage, we have to study the existing system that is available in the market, and do planning for the new system. After finish this stage, it comes to system design.

2. **System And Software Design**

   Under this stage, we will begin the software design stage, where it will establish an overall system architecture.

3. **Implementation And Unit Testing**

   This stage involves representing the software system functions in a form that may be transformed into one or more executable program.

4. **Integration And System Testing**

   The individual program units or programs modules are integrated and tested as a complete system to ensure that the software requirements have been met.

5. **Operation And Maintenance**

   After testing, the system can be installed to its site to be fully utilized. Maintenance for the system has to be done from time to time.

The reasons for choosing Waterfall model as the development methodology are:

- **System are visibility**

  Waterfall model is good visibility. For a relatively big system, documentation of the project is important. It can be used as a reference in the future. The software engineer

can very clearly in mind that at what stage the software process is currently in. This will let them easily manage the software process.

- **System are well structured**
  Waterfall model is good structured. As what we know, the software processes are designed at the beginning of the software development. What we needs to then are developed the system step by step according to the structure of the outlined.

- **System are predictable**
  Waterfall model is more emphasize on planning rather than rapid development. For this purpose, it is easier to estimate the cost needed to develop the system.

- **System are ease to use**
  No special skills are required in this approach. This is because all the outlined of the system is draft out. What the developer needs to do then is done according to what was already structured out.

3.4 System Requirement Analysis

In general, requirement for Electronic Marketing System are partitioned into functional requirements and non-functional requirements. Functional requirements are associated with specific functions, tasks or behaviors the system must support, while non-functional requirements are constraints on various attributes of these functions or tasks.

In terms of the ISO quality characteristics for evaluation (which is concerned primarily with the definition of quality characteristics to be used in the evaluation of software products), the functional requirements address the quality characteristic of functionality while the other quality characteristics are concerned with various kinds of non-functional requirements. Because

non-functional requirements tend to be stated in terms of constraints on the results of tasks, which are given as functional requirements (e.g., constraints on the speed or efficiency of a given task), a task-based functional requirements statement is a useful skeleton upon which to construct a complete requirements statement. That is the approach taken in this work.

3.5 Functional Requirement

Functional requirement is a statement of the services or functions that a system should provide, how the system should react to particular inputs, and how the system should behave in particular situations.

Electronic Marketing System is divided into two major modules. There are **consumer module** and the **personnel module**. Each module has different functional requirements. The following are the functional requirements for this system.

Functional requirement for consumer:

a. **Products Profile**

System will display and introduce the products by providing the products description and products price to let the consumers know more about those products. So, they can choose the right products that can fulfill their needs.

b. **Small Searching Engine**

System will supply a searching capability to flexibility consumers' convenience when they are trying to find certain category of products. What they need to do is just choose the type of products from a combo list, and then the system will display all of products that are match with the chosen category.

c. **Rate The Products**

System will provide a rating function for each product in the online catalog to let consumers give their feedback, opinions, suggestions and comments to that certain product.

d. **Email Feature**

System will provide a link which written as "Email This Item To A Friend" for each product in the products profile that enable consumers to recommend or suggest the certain product to their friends through this email feature.

e. **Shopping Cart**

System will provide a link which written as "Add To Shopping Cart" for each product in the products profile to let consumers purchase the certain product. The purchasing process will be continuing in Electronic Sales System.

f. **Consumer Information**

System will provide a link which written as "Send Me Email Special" to let consumers key in their personal information such as their name, email address and their favorite topic. So that, the retailer is able to inform them when there are new products launch.

Functional requirement for personnel:

a. **Page Maintenance**

System will provide a small template for the purpose of page maintenance. Personnel are allowed to modify and maintain the online catalog. They can add in new products, edit the description of the products and delete the product from the catalog. They also can change the design of the catalog through this template.

b. Image Library

System will provide a library, which is purposely using for keeping all the images or pictures of the products. Personnel not only allow viewing the total of images inside the library, but also can adding in new images and removing images from the library.

c. Generate Survey Report

System will generate a simple survey report from the result of rating products by consumers. From this report, personnel can view the popular products among all the products in the catalog. They also will know the number of access time of this commerce site.

d. Generate Sales Report

System will generate a sales report for all the sales transactions that have been processed in the Electronic Sales. From this report, personnel are able to find out which product is having the rapid sales among all the company's products.

e. Generate Consumer Information

System will generate consumers' information from the data that have been entering by consumers when they are visiting the web site. Through this consumers' information, personnel will able to analyses the favorite of their customers. Besides, they are easy to contact the consumers and send the consumers email featuring great special promotions and information in their stores and on their site.

3.6 Non – Functional Requirement

Non-functional requirement can be defined as the constraints on the services or functions offered by the system. The non-functional requirements for Electronic Marketing System are:

a. Reliability

Reliability is the extents to which a system can be expected to perform its intended function with required precision and accuracy. Thus, the system should be reliable in performing its daily functions and operations. For example, whenever a button is clicked, the system should be able to perform some functionality or generate some message to inform the user what is happening. The system should be robust in design and reliable so that users are convinced in using the system.

b. Scalability

The scalability is to promise the capability of the system to migrate as a client or server to machines of greater or lesser power, depending upon requirements, with little or no change to underlying components. Database scalability issues can be resolved using distributed database architecture whereas web application scaling can be addressed by increasing bandwidth or by additional web servers.

c. Flexibility

The system should have the capability to take advantage of the new technologies and resources. The system should be able to adapt and implement in the changing environment.

d. Usability

The system should be developed in such as way that it is easy to use. It will enhance and support rather than limit or restrict the original process. Human interface need to be designed as intuitive and consistent as it could be with other modules in the environment and within themselves.

e. Security

The system should be equipped with sufficient security. Each access by the user should be authenticated and validated by the system. The system should not show any potential

of leakage of information. The password should be encrypted. This is important to provide security characteristic to privacy and confidential data, in order to avoid improper admission of eavesdroppers or hackers to the system.

f. Maintainability

The system should be designed in such a way that it can be easily understood, and corrected, as well as adapted and allow enhanced in the future. It is of no benefit to develop a system that has no potential for improvements.

g. User – Friendliness

Consistency in terms of screen design and error displays should always be practiced to minimize ambiguity. The system must be able to accommodate a variety of user levels, as not all users have established technical backgrounds. It should provide easy and understandable commands and buttons to avoid blurriness.

h. Modularity

Modularity is a key factor in good programming design. The system should be broke down to modules of functions so that it will be easier for testing and maintenance. Modularity also facilitates future modifications, which leads to further enhancements.

i. Portability

The system should be design in such a way that the application is able to work on various platform and hardware. It should have the capability where migration of component in the system does only require minimum or even no modification, recompiling, reconfiguration or redesign.

3.7 Choice OF Programming And Technologies Tools

An analysis has been carried out in order to select the most appropriate programming and technologies tools that suit the requirements of this system. These tools include the entire platform, servers, and development software and programming languages. Besides considering the suitability of the tools to the requirement, the tools used must be able to support each other. The following are the comparisons between all the programming and technologies tools that have been review in Chapter 2 and the choices that have been decided and chosen:

3.7.1 Conclusion Of Web Development Technology

Active Server Pages provides all of the functionality of CGI applications in an easier-to-use and more robust environment.

ASP is an easier way for your server to access information in a form not readable by the client (such as an SQL database) and then act as a gateway between the two to produce information that the client can view and use.

With CGI, the server creates as many processes as the number of client requests received. The more concurrent requests there are, the more concurrent processes created by the server. However, creating a process for every request is time-consuming and requires large amounts of server RAM. In addition, this can restrict the resources available for sharing from the server application itself, slowing down performance and increasing wait times on the Web.

Active Server Pages runs in the same process as the Web Server, handling client requests faster and more efficiently. It is much easier to develop dynamic content and powerful interactive Web applications with ASP.

More and more web developers are opting for the more advanced ASP rather than the old fashioned CGI. This is because programming languages such as Perl and C or C++ that are used

to write CGI scripts are no longer practical in the quick development of web sites. These languages require time to be familiar with and will therefore take up considerable development time. On the contrary, web developers of today demand a scripting environment that will not only enable them to build Wed sites in the shortest time possible, but also to built interactive web pages as well. As such, ASP is the right choice for me to creating successful e-commerce web sites.

3.7.2 Conclusion Of Operating System

It is undeniable that Linux is considerably less expensive to run as compared to Windows Operating System. Most of the software available for Linux is free, not to mention Linux itself is also free, which makes it suitable for low-cost projects. Linux is much more reliable than Windows Operating System and hence is the better education when running mission critical operations.

However, Windows Operating System still has a lead over Linux when it comes to ease-of-use. Linux is relatively difficult to configure, and learning up its UNIX-based commands may take up a lot of precious time. In other words, Windows Operating System has a shorter learning curve as compared to Linux. Furthermore, Windows Operating System has much more enterprise level software available for it as compared to Linux, which may prove to be essential in developments that required the usage of other software. Windows Operating System also makes administration tasks easier with its easy-to-use wizards and its complete set of help files.

As such, Windows 2000 will be chosen as the platform to develop E-Marketing due to familiarity of use, ease-to-use, and its compatibility with other software. Windows 2000 is more stable than Windows 98/NT systems. It is less likely to clash. Besides, there are so many new features included with Windows 2000 that will be a significant consumer release and will prove

to be a better upgrade than Windows 98/NT was. Also on the upside, Windows 2000 seems to be more Y2K compliant than its predecessors.

3.7.3 Conclusion Of Web Server

Although Apache is proven to be the more powerful Web server here, it is still not as user friendly as Internet Information Server (IIS). Furthermore, Apache servers are known for their difficulty in installation and configuration. As such, it will take considerable time and effort to configure and manage the Apache server, thus making it unsuitable for the development of this project.

Since Windows 2000 will be used as the platform for the development of E-Marketing, IIS would seem to be a better choice here because IIS is one of the built-in applications in Windows 2000 package. Furthermore, IIS is a robust and capable Web server program, which is suitable for small sites right up to enterprise-class sites doing high transaction volumes.

3.7.4 Conclusion Of Web Authoring Tools

Visual InterDev 6.0 provides an ideal environment for developers to visually construct sophisticated HTML and ASP pages. InterDev is also easier to use than Allaire Cold Fusion 4.0 in the sense that most Web developers are already familiar with Visual InterDev and ASP. Furthermore, there are more resources on Visual InterDev and ASP in books and on the Internet in contrast with Cold Fusion.

Cold Fusion 4.0, on the other hand, uses a special, relatively new scripting language called CFML. CFML files require a special server, called the Cold Fusion Server, to be installed on the server first before they can process. The Cold Fusion Server in turn needs to be

configured, and this leads to wastage of precious time. As such, Cold Fusion 4.0 will not be feasible for the development of small projects like E-Marketing

Microsoft FrontPage 2000 is a simple to use HTML editor that churns out simple Web pages in a short period of time. However, the development of E-Marketing will also require more dynamic Web pages, with live animations. Thus, Microsoft FrontPage 2000 is not suitable for the development of this project.

Since E-Marketing will be written using ASP, therefore Microsoft Visual InterDev 6.0 will be chosen as the authoring tool to be used for the development of E-Marketing.

3.7.5 Conclusion Of Scripting Language

Since the development of E-Marketing will require the use of ASP, it is vital that VBScript be utilized as the server-side scripting language, and JavaScript as the client-side scripting language. If you already know Visual Basic or Visual Basic for Applications, VBScript will be very familiar. Even if you don't know Visual Basic, once you learn VBScript, you're on your way to programming with the whole family of Visual Basic languages.

Using Java Script, even less-experienced developers will be able to direct response from a variety of events, objects and actions. It provides anyone who can compose HTML with the ability to change image and play different sounds in response to specified events, such as a users' mouse click or screen exit and entry. JavaScript is a loosely typed language. That means you do not have to declare the data types of variables explicitly. Moreover, in many cases JavaScript performs conversions automatically when they are needed. For instance, if you try to add a number to an item that consists of text (a string), the number is converted to text.

Besides, VBScript and JavaScript are implemented as a Windows Script engine. This means that they can be "plugged in" to any application that supports Windows Script, such as Internet Explorer, Active Server Pages, and Windows Script Host. Furthermore, there are a lot of resources about VBScript and JavaScript in books and on the Internet, which facilitates the development of this project.

PerlScript, on the other hand, users the old fashion Perl programming language. This is not in accordance with the objective of this project, which is to make use of the latest Web advancements to set up an e-commerce Web site. Hence, PerlScript will not be used for this project.

The usage of PHP and CFML will each require the setting up of the PHP Hypertext Preprocessor and the Cold Fusion Server on the server. This will only lead to additional configuration works, which may take up a lot of precious time. Not to mention the time taken up just to learn up theses two relatively new scripting language. As such, PHP and CFML will not be considered to be feasible for this project.

3.7.6 Conclusion Of Database

Access 2000 and SQL Server 7.0 are excellent database management software from Microsoft. Both of them are easy to use and are efficient at handling databases. As such, both of them are worthy of consideration for this project.

Access 2000 is suitable for use with small to medium-sized database. However, the size of a database may grow rather huge at times, and this is when Access 2000 starts to reveal its deficiencies. Access 2000 has the tendency of slowing down when the tables in a database gets too huge. This may not be practical for e-commerce Web sites running huge databases, as the opportunity costs arising from the slowing down of the database may be significant. As such, Access 2000 is unsuitable for the management of huge databases.

SQL Server 7.0, on the other hand, works well with databases of any size. It contains all the user-friendly features of Access 2000, yet it works so many times more efficiently than Access 2000. It has the ability of handling hundreds of transactions simultaneously without affecting performance.

SQL Server 7.0 will therefore be chosen to act as the database management software for the development of E-Marketing.

3.8 Runtime Environment

The following are the runtime environment for Electronic Marketing System:

Hardware Requirements:

The hardware requirements for installing Electronic Marketing System are summarized in Table 3.1

Component	Description
Microprocessor	Intel Pentium 166 MHz and above
RAM	64 MB RAM and above
Storage	2 GB hard disk with a minimum of 650MB of free space PS/2 Keyboard (Else a converter is required)

Table 3.1 Hardware Requirements

Software Requirements:

The software requirements for installing Electronic Marketing System are summarized in Table 3.2

Description	Technologies/Software
Operating system/ Platform	Windows 2000 Server
Web server	Internet Information Server (IIS)
Web development technology	Active Server Pages (ASP)
Web authoring tool	Microsoft Visual InterDev 6.0
Markup and scripting language	HTML, VBScript, JavaScript
Database	Microsoft SQL Server 7.0

Table 3.2 Software Requirements

3.9 Summary

In this chapter, study has been carried out on the proposed Electronic Marketing System to find out the suitable methodology used. Waterfall Methodology has been chosen for its stability and structure. Besides, various techniques of gathering information have been reviewed to gather sound and good information as guidance to the proposed system. System requirements such as functional requirements and non-functional requirements have been investigated and analysed.

The development programming and technologies tools have been rectified as well. As a result, Windows 2000 has been chosen as the system platform, IIS as the web server, ASP as the development technology, Microsoft Visual InterDev 6.0 as the web-authoring tool, HTML, VBScript and JavaScript as the scripting language and the Microsoft SQL Server 7.0 as the database management system.

CHAPTER FOUR

System Design

Chapter 4 System Design

4.1 Introduction

System design is a creative process of transforming the problem into solution and the description of the solution. The goal of system design is to translate the requirements defined during the system analysis phase into a working model or representation of an entity that will be built later. During this phase, quality is fostered. System design involves designing of program, database and user interfaces. System design has to go through a thorough modification and testing before coming to a complete system. Amendment has to be done on every occurrence of mistakes especially in coding, user interfaces and database design. Under this chapter, the system design will be discussed into the following few components:

- System Functionality Design
- Database Design
- Graphical User Interface Design

4.2 System Functionality Design

In system functionality design, it will include description on the system architecture, context flow diagram, data flow diagram, and system structure chart for Electronic Marketing.

4.2.1 System Architecture

The Electronic Marketing System is based on the three-tier client/server architecture. Three-tier is the new growth area for client/server computing because it meets the requirements of large-scale Internet and intranet client/server applications.

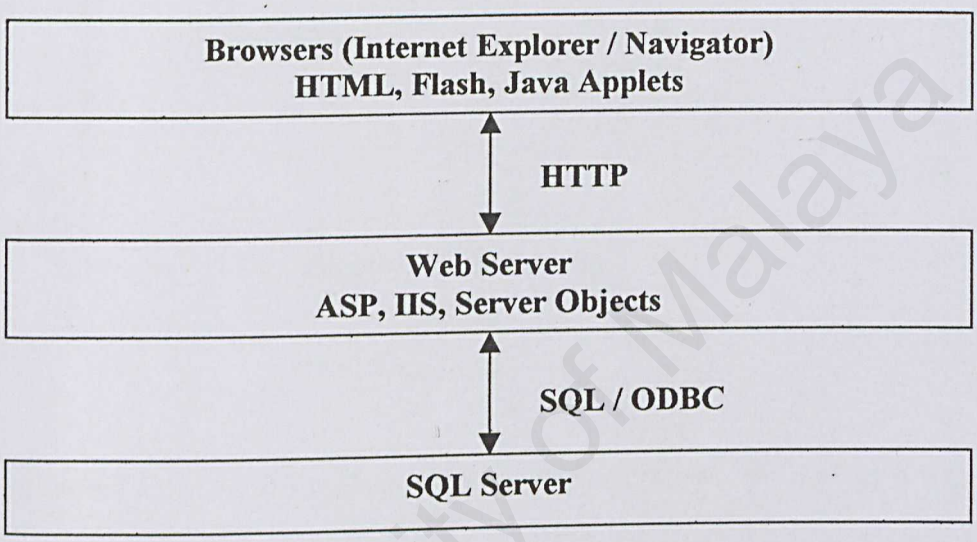


Figure 4.1 Three Layers In System Data Flow

In three-tier architecture, the business rules are removed from the client and are executed on a system in between the user interface and the data storage system. The client application provides user interface for the system. The business rules server ensures that all of the business processing is done correctly. It serves as an intermediary between the client and the data storage. In this type of architecture, the client would never access the data storage system directly. This type of system allows for any part of the system to be modified without having to change the other two parts. Since the parts of the application communicate through interfaces, then as long as the interface remains the same, the internal working can be changed without affecting the rest of the system.

Three-tier applications are easier to manage and deploy on the network – most of the code runs on the servers, especially with zero-footprint technologies like Java applets. In addition, three-tier applications minimize network interchanges by creating abstract levels of service. Three-tier substitutes a few server calls for many SQL queries and updates, so it performs much better than two-tier. It also provides better security by not exposing the database schema to the client and by enabling more fine-grained authorization on the server.

4.2.2 Context Data Flow Diagram

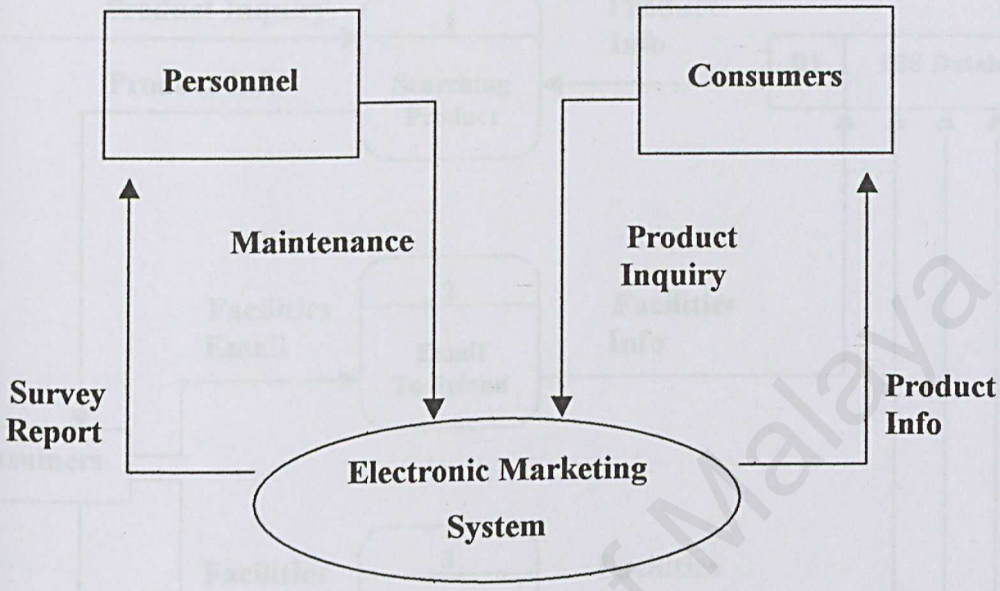


Figure 4.2 Context Data Flow Diagram for Electronic Marketing System

A context data flow diagram defines the scope and boundary for the system and project. Because the scope of any project is always subject to change, the context diagram also subject to constant change.

Figure 4.2 Context Data Flow Diagram for Electronic Marketing System

This figure shows that the Electronic Marketing System is divided into two modules. There are personnel and consumers. Personnel are responsibility to do the maintenance for this system and reports will be generated for certain period of processing. Meanwhile this system is responsibility to provide the product information to consumers.

4.2.3 Data Flow Diagram

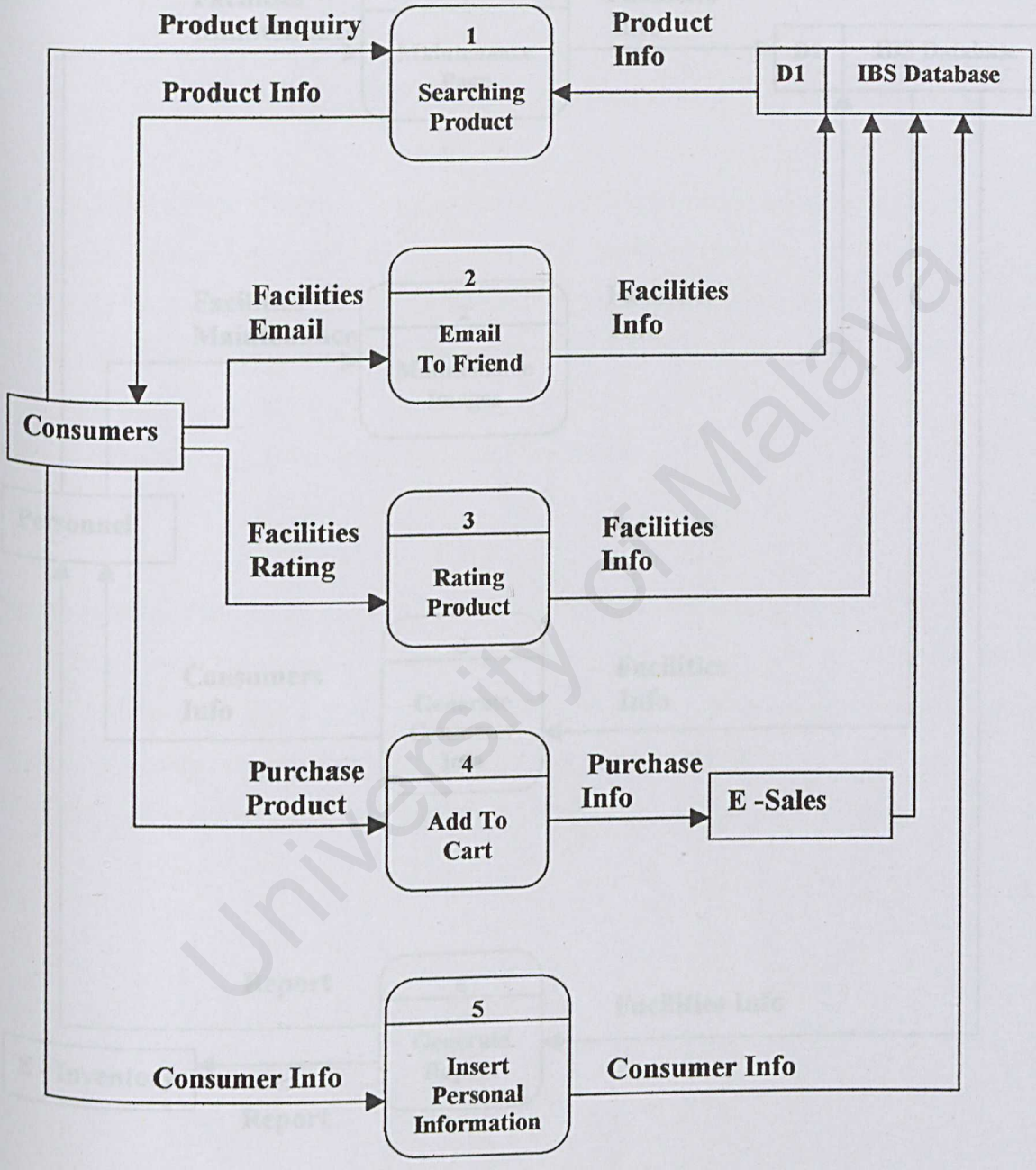


Figure 4.3 Data Flow Diagram for Consumers in Electronic Marketing System

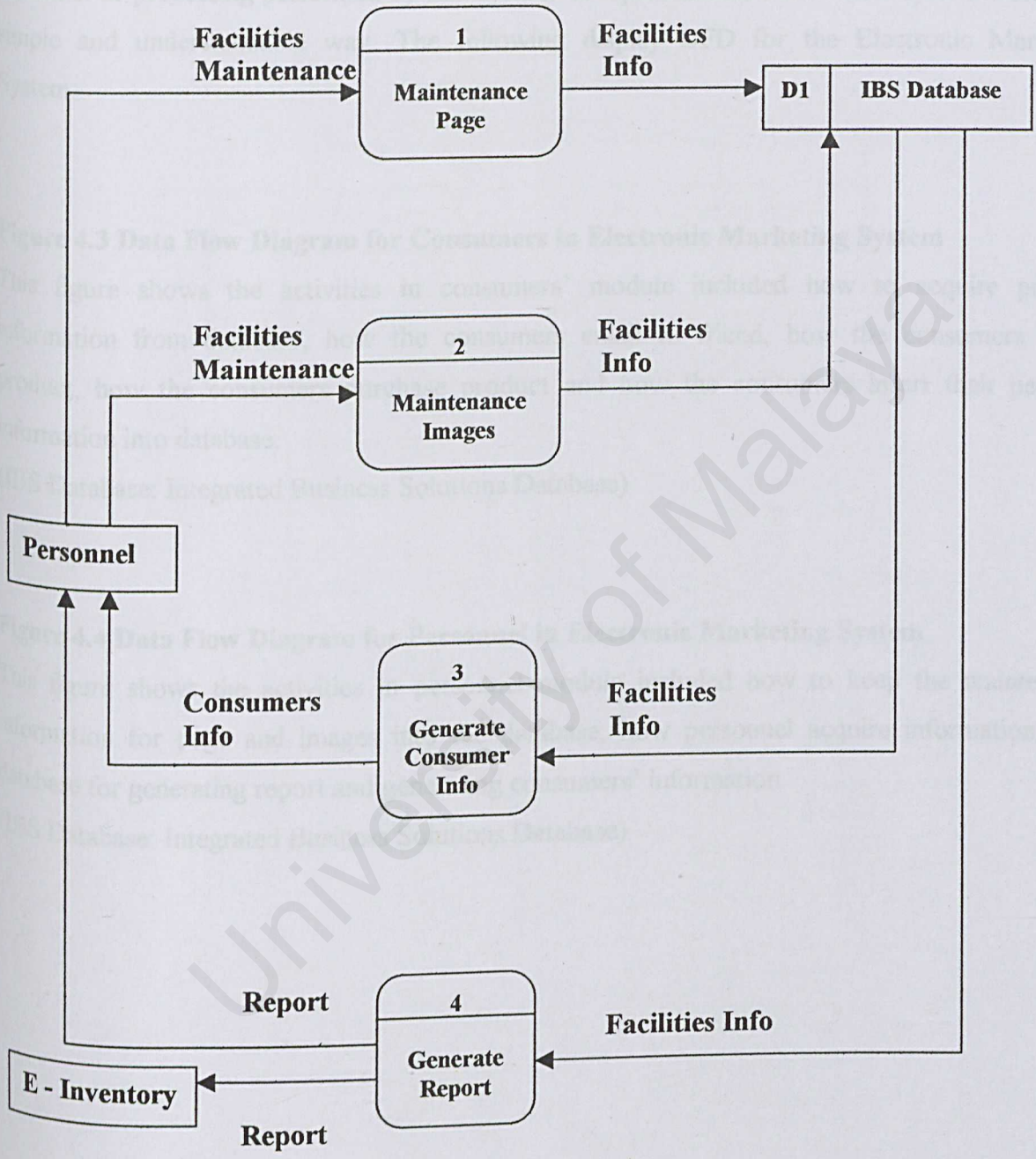


Figure 4.4 Data Flow Diagram for Personnel in Electronic Marketing System

A data flow diagram (DFD) is a tool that depicts the flow of data through a system and the work or processing performed by that system. It represents how the whole system works in a simple and understandable way. The following display DFD for the Electronic Marketing System.

Figure 4.3 Data Flow Diagram for Consumers in Electronic Marketing System

This figure shows the activities in consumers' module included how to acquire product information from database, how the consumers email to friend, how the consumers rating product, how the consumers purchase product and how the consumers insert their personal information into database.

(IBS Database: Integrated Business Solutions Database)

Figure 4.4 Data Flow Diagram for Personnel in Electronic Marketing System

This figure shows the activities in personnel module included how to keep the maintenance information for page and images into the database, how personnel acquire information from database for generating report and generating consumers' information.

(IBS Database: Integrated Business Solutions Database)

4.2.4 System Structure Chart

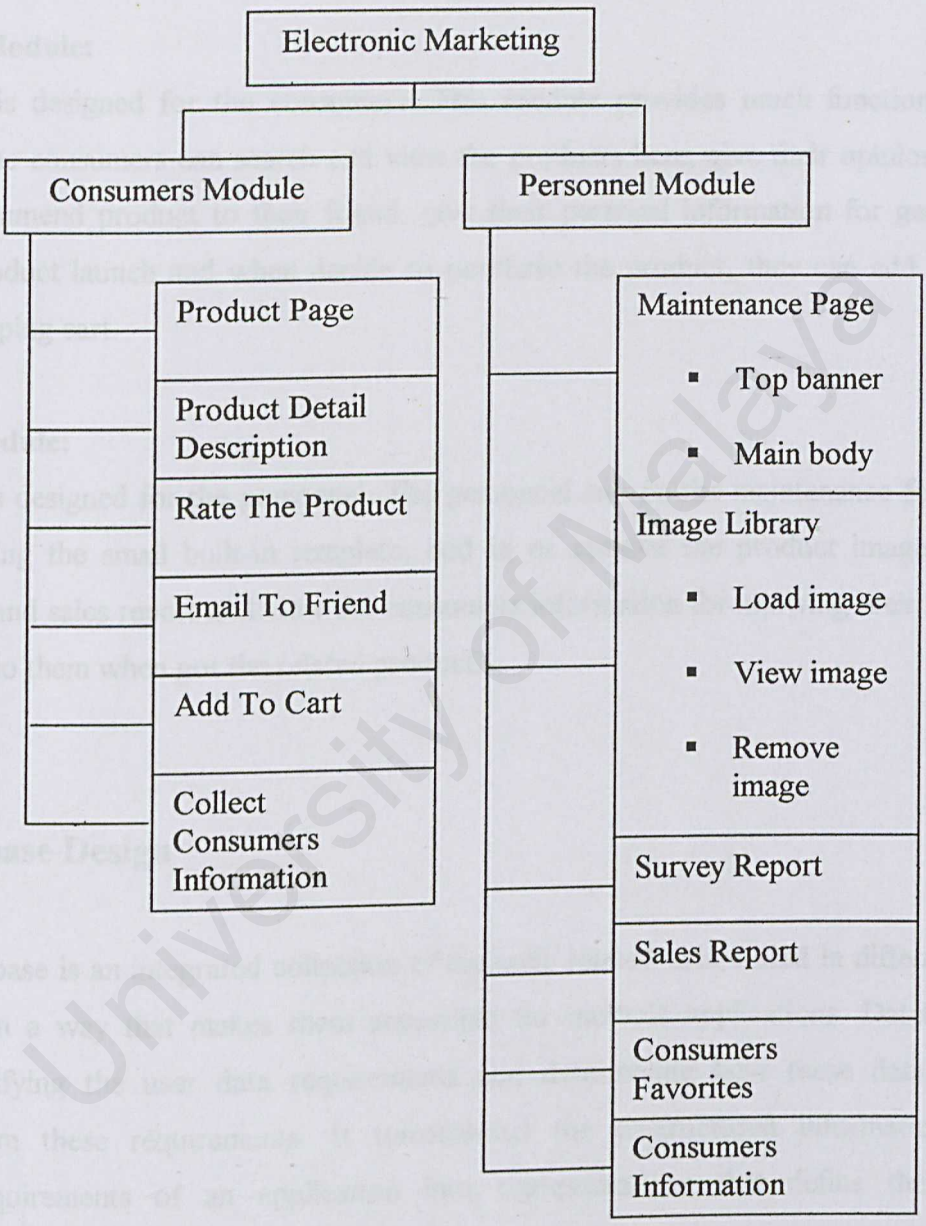


Figure 4.5 System Structure Chart For Electronic Marketing System

This system structure chart performs different system functions in Electronic Marketing System.

Consumers Module:
This module is designed for the consumers. This module provides much functionality to the consumers. The consumers can search and view the products here, give their opinions about the product, recommend product to their friend, give their personal information for getting inform when new product launch and when decide to purchase the product, they can add the product into their shopping cart.

Personnel Module:
This module is designed for the personnel. The personnel can do the maintenance for the online catalog by using the small built-in template, add in or remove the product images, view the survey report and sales report and view the consumers information for knowing their favorite and sending email to them when got the related product.

4.3 Database Design

A database is an integrated collection of logically related data stored in different types of records, and in a way that makes them accessible for multiple applications. Database design involves identifying the user data requirements and determining how these data should be structured from these requirements. It transformed the unstructured information and the processing requirements of an application into representations that define the functional specifications.

Efficiency and effectiveness of information retrieval and storage are based on good database design. Failure may happen to database if earlier considerations (size of each field in table, relationship of tables and the likes) are not taken. Under this stage, data models will be

translate into data structure during the definition phase. Under this topic, the database design will be discussed into the following few components:

- Data Structure
- Entity Relationship Model
- Data Dictionary

4.3.1 Database Structure

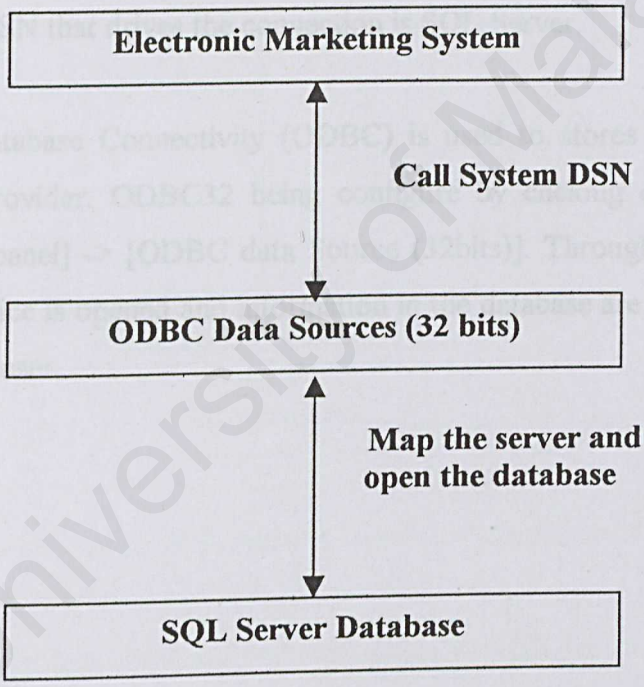


Figure 4.6 ODBC 32 as "Middleman" Between Electronic Marketing System and SQL Server Database

The database management software of Electronic Marketing System is Microsoft SQL Server 7.0. It is crucial to configure the connection between SQL Server and the application, in this case, the ASP files. The figure 4.6 illustrates the mapping of the SQL Server to the application via Open Database Connectivity (ODBC).

In Electronic Marketing System, the system needs to use 32 bits version of the ODBC (the one comes with Windows 95, 98, 2000 and Windows NT). It also needs to configure itself to use the system Data Source Name (DSN) connectivity, so that the system can access the database. For example, when a consumer clicks the search product in the product page, the system will call the Data Source Name (DSN) to establish the connection string of system to database. The system DSN that drives the connection is SQL Server.

32-bit Open Database Connectivity (ODBC) is used to stores information on how to connect to the data provider. ODBC32 being configure by clicking on the menu [Start] -> [Settings] -> [Control panel] -> [ODBC data Source (32bits)]. Through the ODBC, Electronic Marketing database device is opened and information in the database are accessible. Requests are processed and return to user.

4.3.2 Entity Relationship (E-R) Model

The following figures is the relationship of the database that illustrated with an E-R diagram.

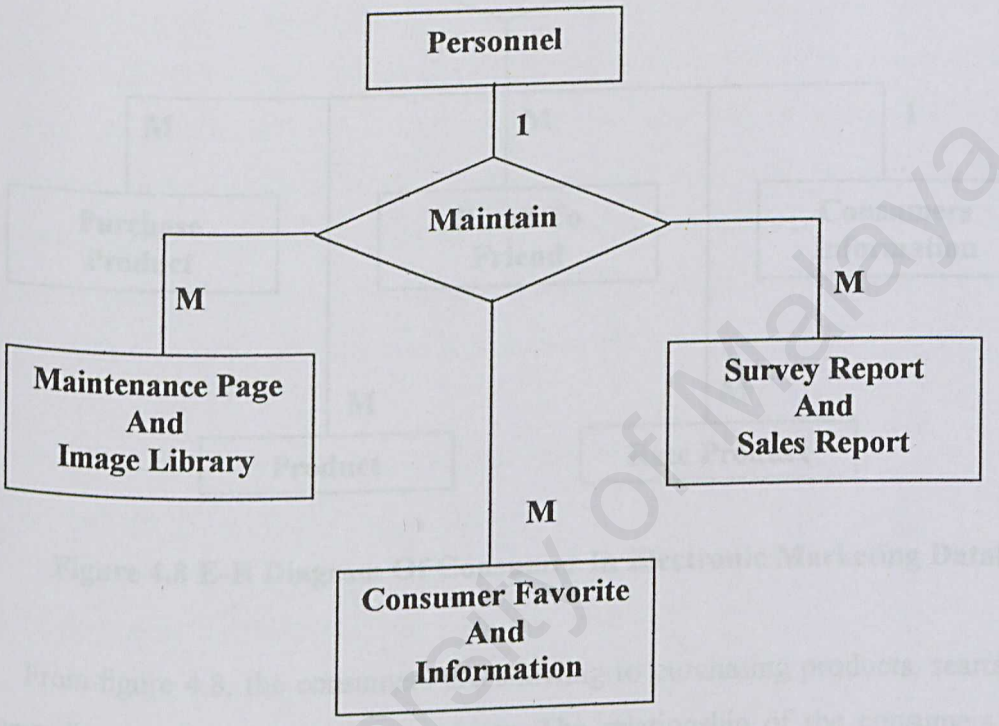


Figure 4.7 E-R Diagram Of Personnel In Electronic Marketing Database

From figure 4.7, the personnel are responsible to maintain the online catalog and image library. They also have to generate consumer favorite and information. Survey report and sales report will be generated too. The relationship of the personnel to these three main activities is one to many.

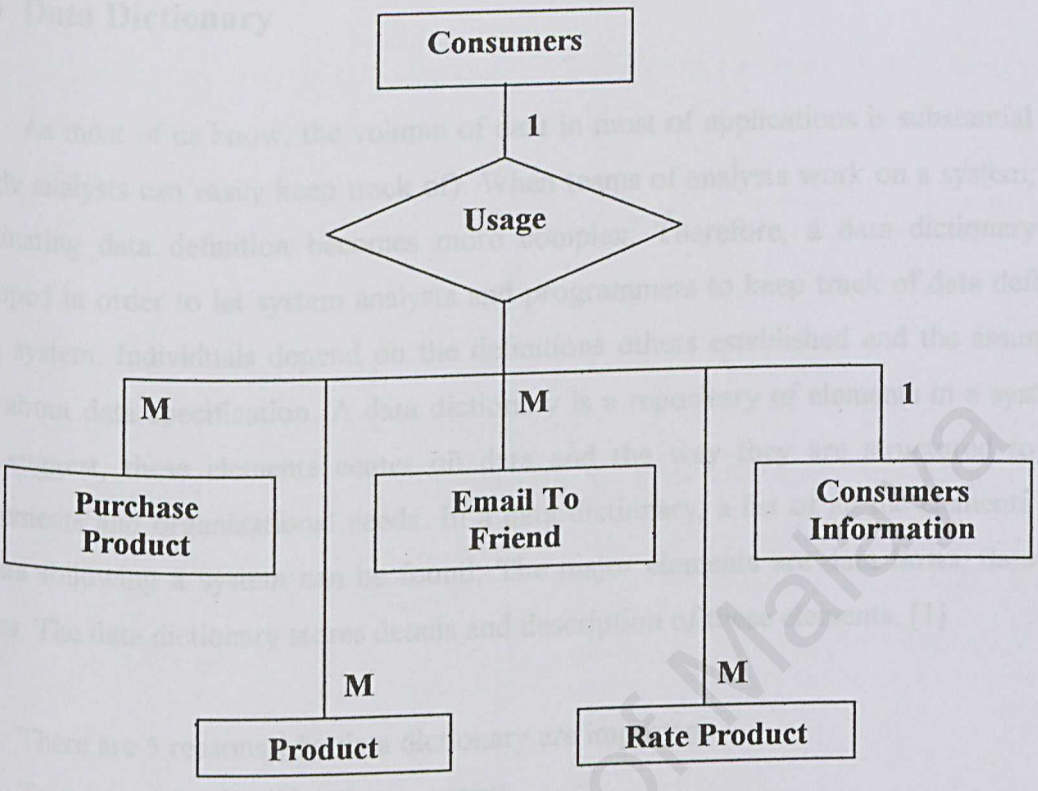


Figure 4.8 E-R Diagram Of Consumer In Electronic Marketing Database

From figure 4.8, the consumers are allowing to purchasing products, searching products, recommending products and rating products. The relationship of the consumers to these four main activities is one to many. Meanwhile, the relationship of the consumers and insert consumers information is one to one.

4.3.3 Data Dictionary

As most of us know, the volume of data in most of applications is substantial (more than a single analysts can easily keep track of). When teams of analysts work on a system, the task of coordinating data definition becomes more complex. Therefore, a data dictionary has to be developed in order to let system analysts and programmers to keep track of data definition used in the system. Individuals depend on the definitions others established and the assumption they made about data specification. A data dictionary is a repository of elements in a system. As the name suggest, these elements center on data and the way they are structured to meet user requirements and organizational needs. In a data dictionary, a list of all the elements composing the data following a system can be found. The major elements are data flows, data stores and process. The data dictionary stores details and description of these elements. [1]

There are 5 reasons why data dictionary are important.

1. To manage the detail in a large system.
2. To communicate a common meaning for all system elements.
3. To document the features of the system.
4. To facilitate analysis of the details, in order to evaluate characteristic and determine where system changes should be made.
5. To locate errors and omission in the system.

The following are the data dictionary that explains the items and fields of the database that used in the Electronic Marketing System. The database name is (not sure yet).

(Notes: * Primary Key)

Table 4.1: New Category Table

Table Name	**:**	NewCategory	
Description	**:**	Contain information of new category product	
Field Name	**Data Type**	**Length**	**Description**
* Category_Code	Nvarchar	50	The code of category product
Category_Desc	Ntext	16	The description of category product

Table 4.2: New Sub-Category Table

Table Name	**:**	NewSubCategory	
Description	**:**	Contain information of new product in menu	
Field Name	**Data Type**	**Length**	**Description**
* Category_Code	Nvarchar	50	The code of category product
* SubCategy_Code	Nvarchar	50	The code of sub-category product
SubCategy_Desc	Ntext	16	The description of sub-category product

Table 4.3: New Product Table

Table Name	**:**	NewProduct	
Description	**:**	Contain information of new product in menu	
Field Name	**Data Type**	**Length**	**Description**
* Category_Code	Nvarchar	50	The code of category product
* SubCategy_Code	Nvarchar	50	The code of sub-category product
* Product_Code	Nvarchar	50	The code of product
Product_Name	Ntext	16	The name of product
Product_Desc	Ntext	16	The description of product
Unit	Varchar	10	The unit of product
Price	Nvarchar	50	The price of product
Supplier	Nvarchar	50	The supplier of product
Image	Nvarchar	50	The image of product
Area_Num	Int	4	The number of menu area
Status	Nvarchar	50	The status of menu area

Table 4.4: Main Body Information Table

Table Name	:	MainBody	
Description	:	Contain information of main body in template	
Field Name	**Data Type**	**Length**	**Description**
* Category_Code	Varchar	10	The code of category product
* SubCategy_Code	Varchar	10	The code of sub-category product
* Product_Code	Varchar	10	The code of product
* Area_Num	Int	4	The number of menu area
Product_Image	Nvarchar	50	The image of product
Product_Name	Ntext	16	The name of product
Product_Desc	Ntext	16	The description of product
Unit	Varchar	10	The unit of product
Price	Nvarchar	50	The price of product
Supplier	Nvarchar	50	The supplier of product
Font_Name	Nvarchar	50	Font name for menu text
Font_Size	Int	4	Font size for menu text
Font_Color	Nvarchar	50	Font color of menu text
Bold	Nvarchar	10	Display menu text in bold style
Italic	Nvarchar	10	Display menu text in italic style
Date	Datetime	8	Date for this menu is created

Table 4.5: Top Banner Information Table

Table Name	:	TopBanner	
Description	:	Contain information of top banner in template	
Field Name	**Data Type**	**Length**	**Description**
Background	Nvarchar	50	The background of menu area
Logo	Nvarchar	50	The logo of company
Heading	Nvarchar	50	The name of company
Font_Name	Nvarchar	50	Font name for menu text
Font_Size	Int	4	Font size for menu text
Font_Color	Nvarchar	50	Font color of menu text
Bold	Nvarchar	10	Display menu text in bold style
Italic	Nvarchar	10	Display menu text in italic style
Area_Num	Int	4	The number of menu area

Table 4.6: Template Table

Table Name	:	TemplateItem	
Description	:	Contain information of item in template	
Field Name	**Data Type**	**Length**	**Description**
Template_Name	Nvarchar	50	Type of template item. E.g. top banner..
Item_Number	Int	4	Quantity of template item
Line_Number	Int	4	Line number where the item is located
Item_Type	Nvarchar	50	Type of line item. E.g. image, text…
Percentage	Int	4	Width in percentage
Width	Int	4	Width of this item
Height	Int	4	Height of this item

Table 4.7: Consumer Information Table

Table Name	**:**	ConsumerInfo	
Description	**:**	Contain information of consumer during recommending product to their friend	
Field Name	**Data Type**	**Length**	**Description**
Number	Nvarchar	10	The number of this email
Category_Code	Varchar	10	The code of category product
SubCategy_Code	Varchar	10	The code of sub-category product
Product_Code	Varchar	10	The code of product
Product_Name	Nvarchar	50	The name of product
Sen_Email	Nvarchar	50	The email address of sender
Sen_First_Name	Nvarchar	50	The first name of sender
Sen_Last_Name	Nvarchar	50	The last name of sender
Rep_Email	Nvarchar	50	The email address of recipient
Rep_First_Name	Nvarchar	50	The first name of recipient
Rep_Last_Name	Nvarchar	50	The last name of recipient
Date	Datetime	8	Date for this email is sent

Table 4.8: Consumer Favorites Table

Table Name	:	ConsumerFavorites	
Description	:	Contain information of consumer favorites	
Field Name	**Data Type**	**Length**	**Description**
Number	Nvarchar	10	The number of this information
Email	Nvarchar	50	The email address of consumer
First_Name	Nvarchar	50	The first name of consumer
Last_Name	Nvarchar	50	The last name of consumer
Administration	Nvarchar	10	The favorite area 1 of consumer
Architecture	Nvarchar	10	The favorite area 2 of consumer
Education	Nvarchar	10	The favorite area 3 of consumer
Electrical	Nvarchar	10	The favorite area 4 of consumer
Engineering	Nvarchar	10	The favorite area 5 of consumer
Entertainment	Nvarchar	10	The favorite area 6 of consumer
Finance	Nvarchar	10	The favorite area 7 of consumer
Health	Nvarchar	10	The favorite area 8 of consumer
Computer	Nvarchar	10	The favorite area 9 of consumer
Manufacturing	Nvarchar	10	The favorite area 10 of consumer
Marketing	Nvarchar	10	The favorite area 11 of consumer
Mechanical	Nvarchar	10	The favorite area 12 of consumer
Science	Nvarchar	10	The favorite area 13 of consumer
Date	Datetime	8	Date for this information is recorded

Table 4.9: Rating Information Table

Table Name	:	RateInfo	
Description	:	Contain information of rating product	
Field Name	**Data Type**	**Length**	**Description**
Category_Code	Varchar	10	The code of category product
SubCategy_Code	Varchar	10	The code of sub-category product
Product_Code	Varchar	10	The code of product
Product_Name	Nvarchar	50	The name of product
Best	Nvarchar	10	The first grade of product
Good	Nvarchar	10	The second grade of product
Moderate	Nvarchar	10	The third grade of product
Bad	Nvarchar	10	The fourth grade of product
Worse	Nvarchar	10	The fifth grade of product
Date	Datetime	8	Date for this product is rated

Table 4.10: Sales Order Table

Table Name	:	SalesOrder	
Description	:	Contain information of total products which have been sold	
Field Name	**Data Type**	**Length**	**Description**
Category_Code	Varchar	10	The code of category product
SubCategy_Code	Varchar	10	The code of sub-category product
Product_Code	Varchar	10	The code of product
Product_Name	Nvarchar	50	The name of product
Quantity	Int	4	The amount of the product
Unit_Price	Money	8	The price for one item
Total_Price	Money	8	The total amount for this transaction
Supplier	Nvarchar	50	The supplier of product
Date	Datetime	8	Date for this transaction is recorded

4.4 Graphical User Interface Design

The Electronic Marketing System is a web-based system. Thus the Graphical User Interfaces (GUIs) play an increasingly important role of the system. The web pages will be designed so that it is easier to use, and a user do not have to require training and minimal support.

Among the important points that are crucial in developing a good GUI:

- Navigational assistance
- Consistency, clarify and user feedback
- Color and font tips

The Electronic Marketing System is designed with improved efficiency and effectiveness of the user in mind. The interface design technique is common with other web sites with all the buttons, interactive menus (using DHTML) and hyperlinks.

4.4.1 Design Of Screen

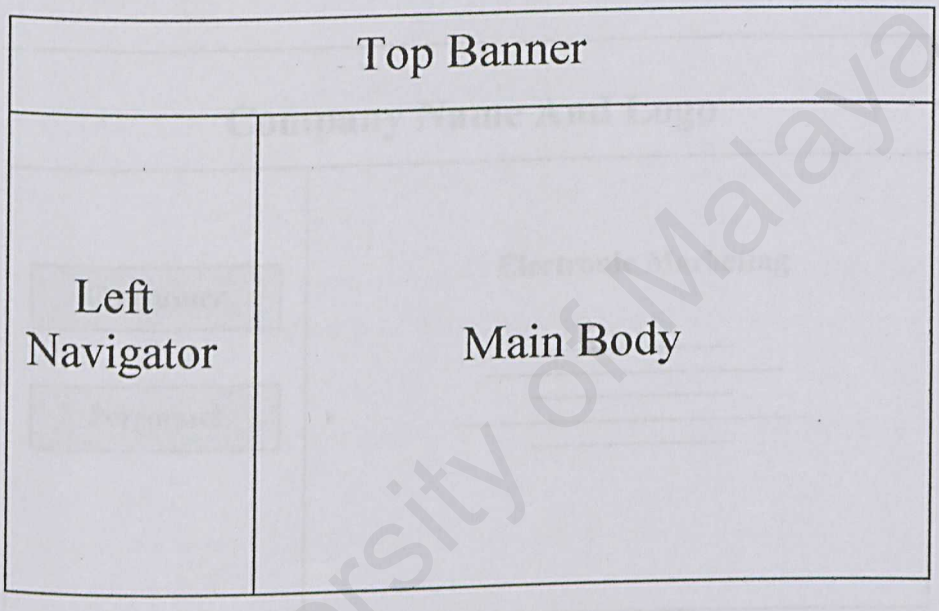


Figure 4.9: The Screen Design

The web site is consists of web pages based on a common template. The pages are divided into three parts, namely Left Navigation, Top Banner and Main Body. The Left Navigation is a part consists of DHTML menus and buttons. The Top Banner is where the company logo and company name are located. While in the Main Body, there will be the main contents of those web pages.

4.4.2 Expected Outcome

All the web pages in Electronic Marketing System are having design for Left Navigation. Anywhere, here only showed out three main web pages of this system with the design of Left Navigation. The three main web pages are Figure 4.9, Figure 4.10 and Figure 4.)

This is the introduction page for Electronic Marketing System.

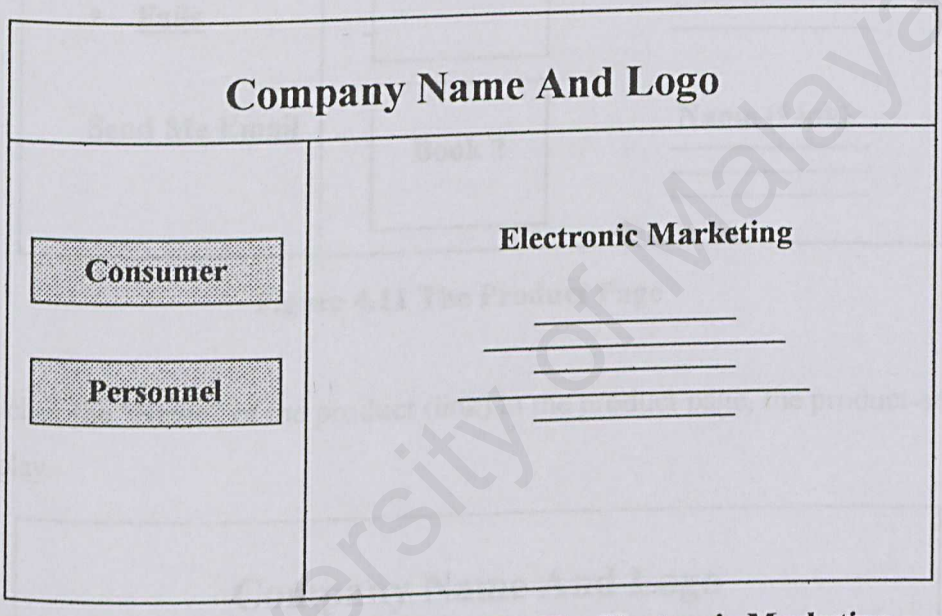


Figure 4.10 The Introduction For The Electronic Marketing

When you click "Consumer" (button) in the introduction page, the product page will be displayed.

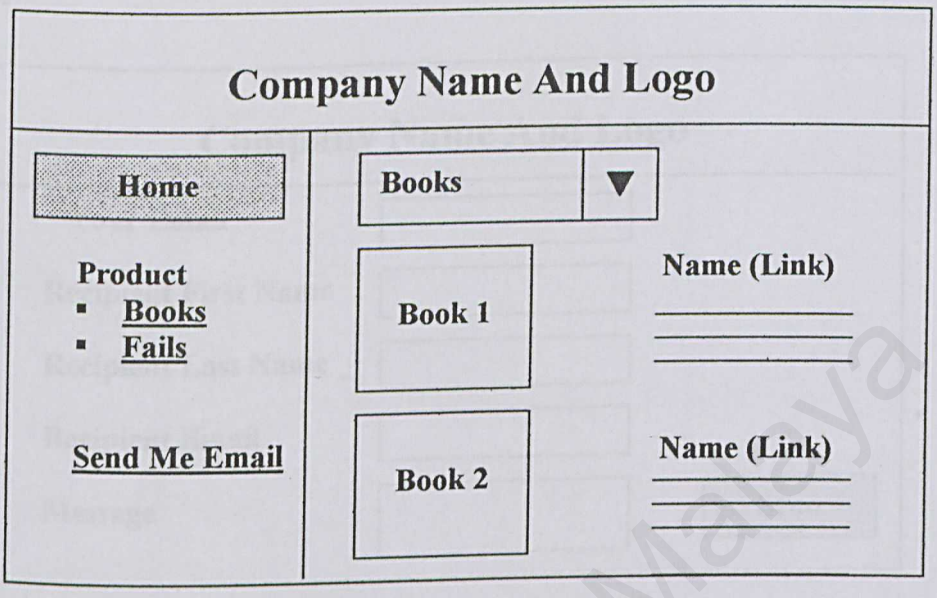


Figure 4.11 The Product Page

When you click the "Name" of the product (link) in the product page, the product-selected page will be display.

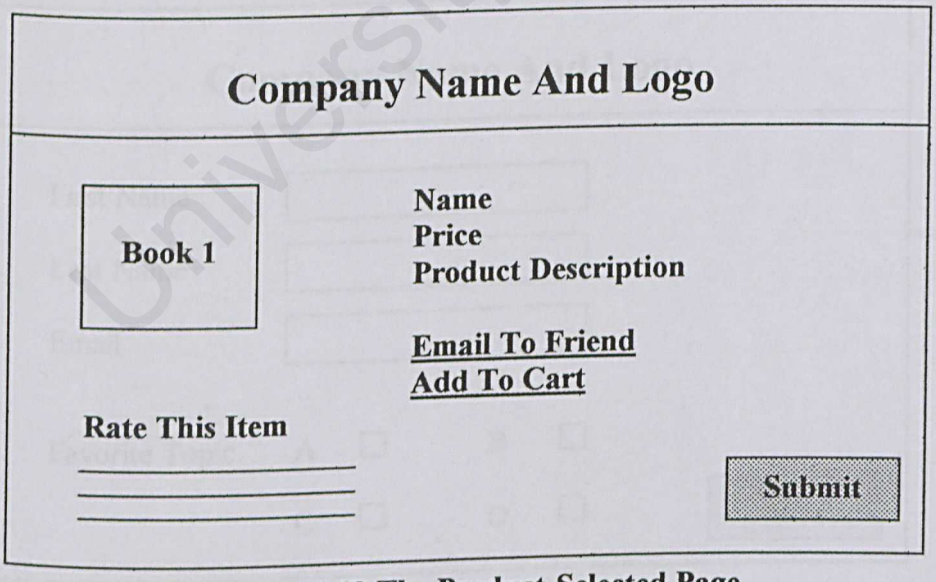


Figure 4.12 The Product-Selected Page

When you click "Email To Friend" (link) in the product-selected page, the email content page will be display.

Figure 4.13 The Email Content Page

When you click "Send Me Email"(link) in the in product page, the consumer info page will be displayed.

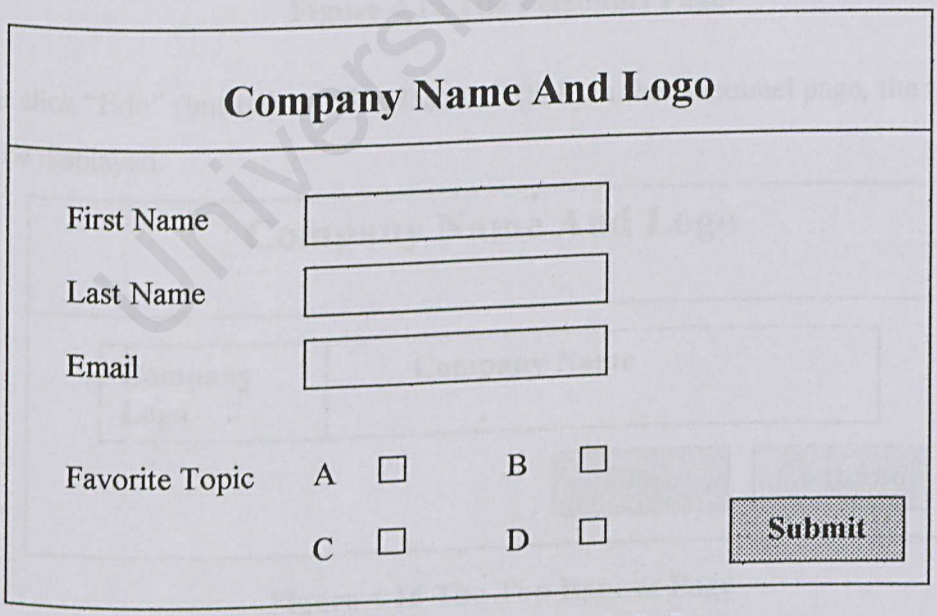


Figure 4.14 The Consumer Info Page

When you click "Personnel" (button) in the introduction page, the personnel page will be displayed.

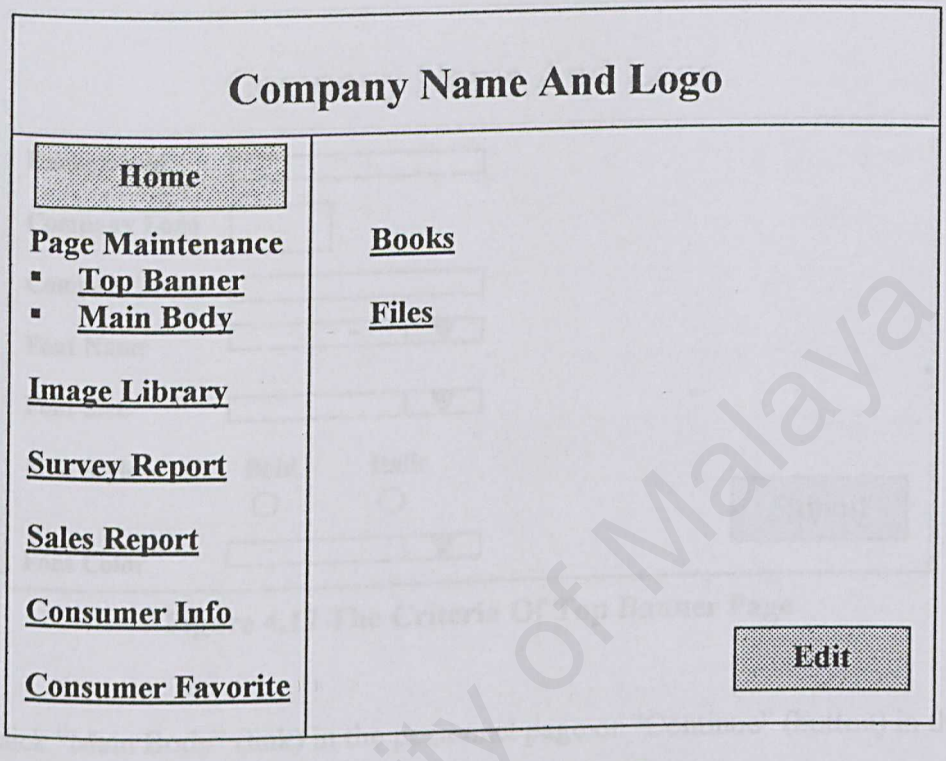


Figure 4.15 The Personnel Page

When you click "Edit" (button) or "Top Banner" (link) in the personnel page, the top banner page will be displayed.

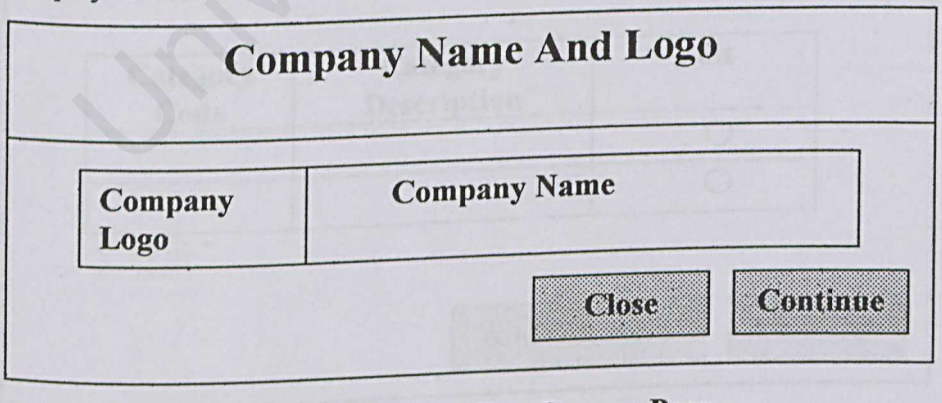


Figure 4.16 The Top Banner Page

When you click "The column of the company logo and company name" in the top banner page, the criteria of top banner page will be displayed.

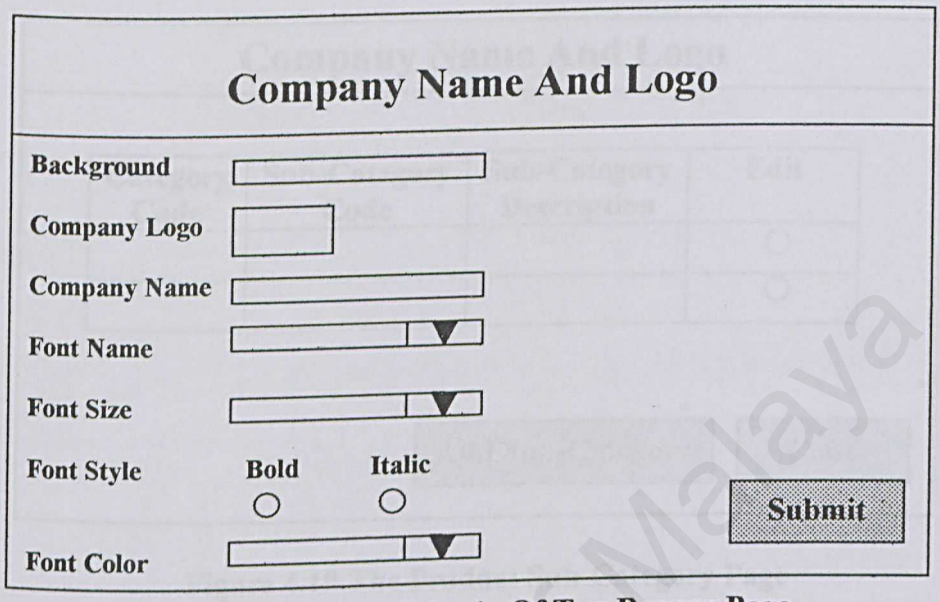


Figure 4.17 The Criteria Of Top Banner Page

When you click "Main Body" (link) in the personnel page or "Continue" (button) in the top banner page, the product category page will be displayed.

Figure 4.18 The Product Category Page

When you click "Edit" (radio button) in the product category page, the product sub-category page will be displayed.

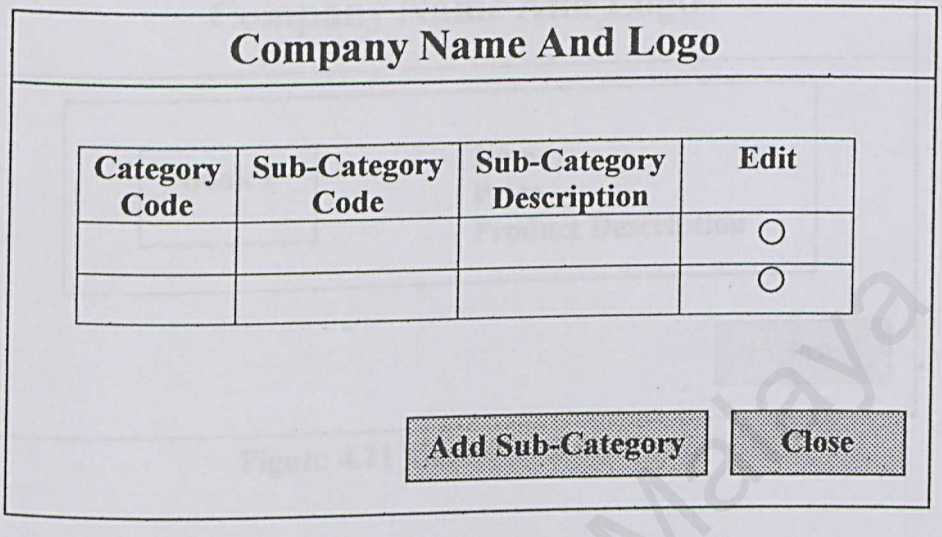


Figure 4.19 The Product Sub-Category Page

When you click "Edit" (radio button) in the product sub-category page, the product lists page will be displayed.

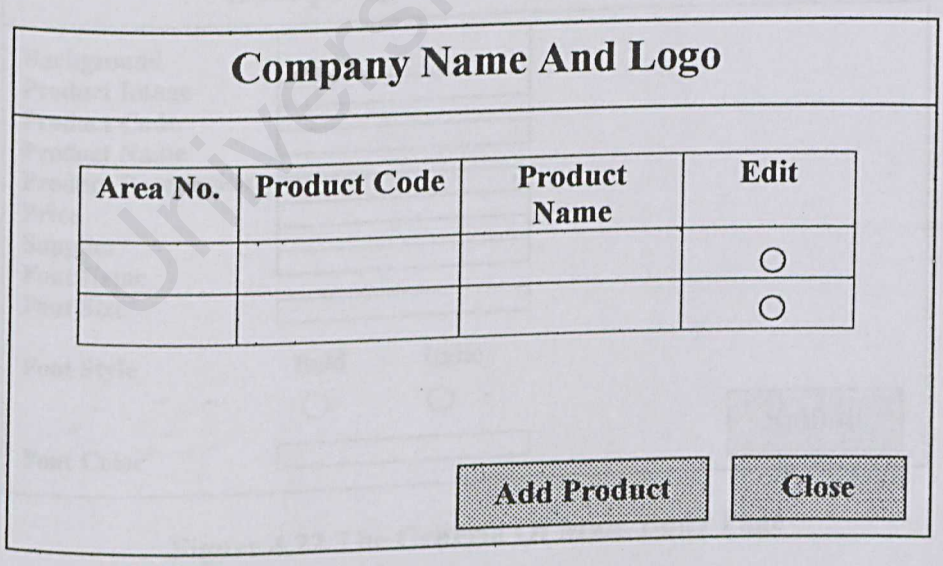


Figure 4.20 The Product Lists Page

When you click "Edit" (radio button) in the product lists page, the main body page will be displayed.

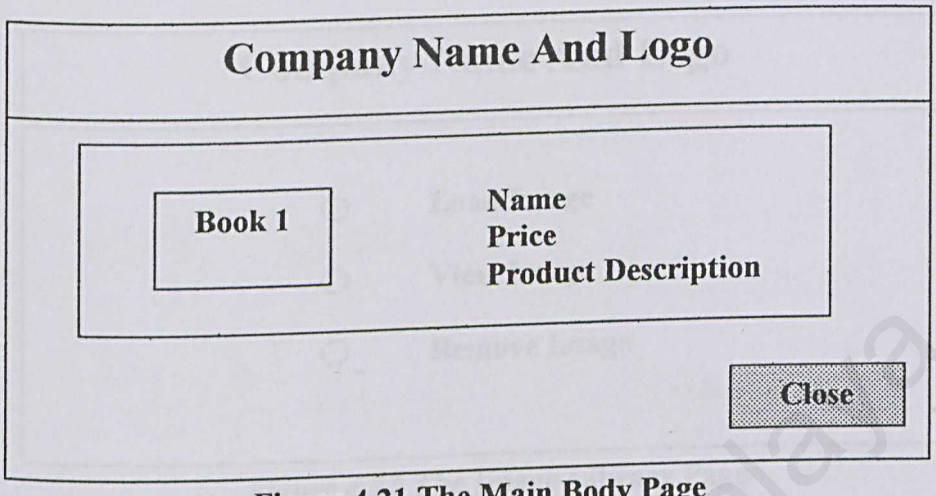


Figure 4.21 The Main Body Page

hen you click "The column of image, name, price and product description" in the main body page, the criteria of main body page will be displayed.

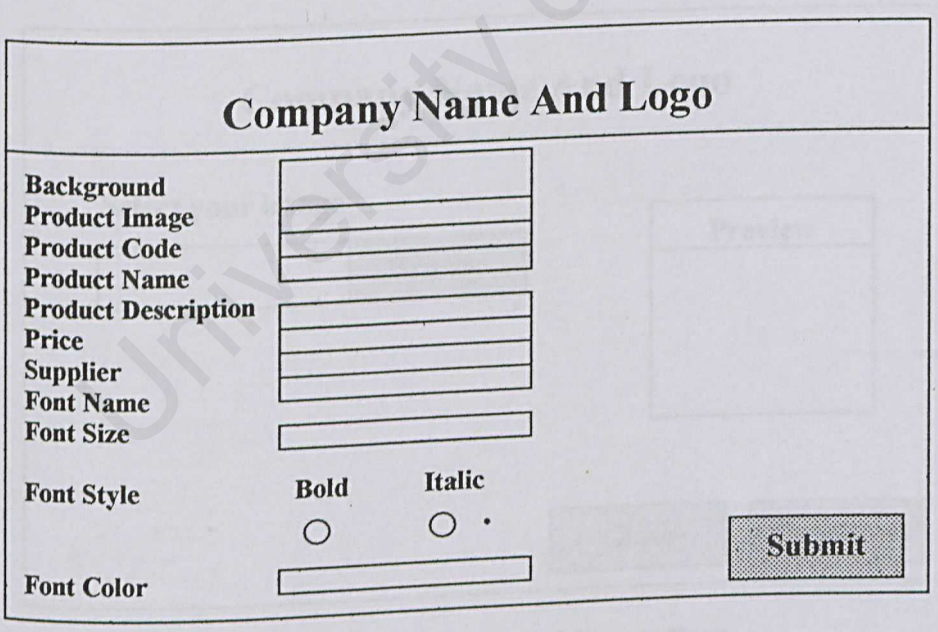


Figure 4.22 The Criteria Of Main Body Page

When you click "Image Library" (link) in the personnel page, the image library page will be displayed.

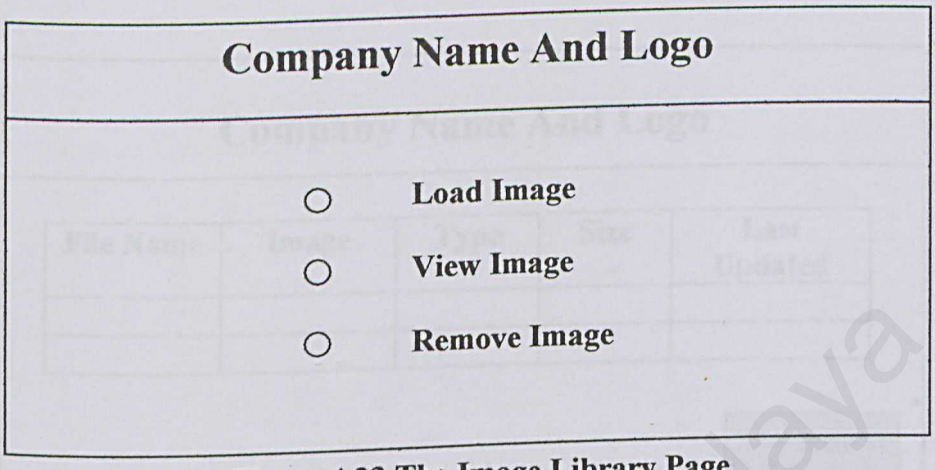


Figure 4.23 The Image Library Page

When you click "Load Image" (radio button) in the image library page, the load image page will be displayed.

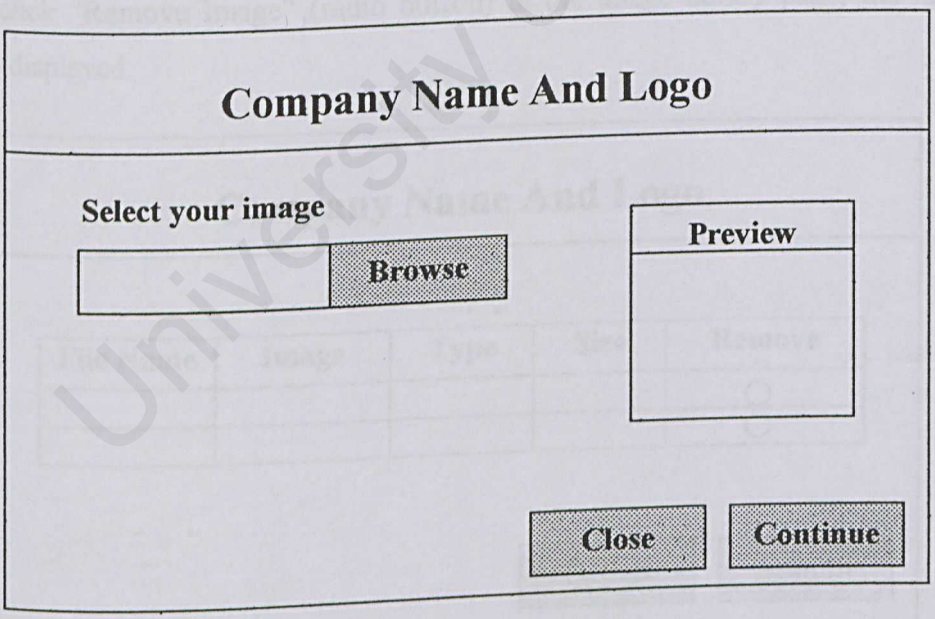


Figure 4.24 The Load Image Page

When you click "View Image" (radio button) in the image library page, the view image page will be displayed.

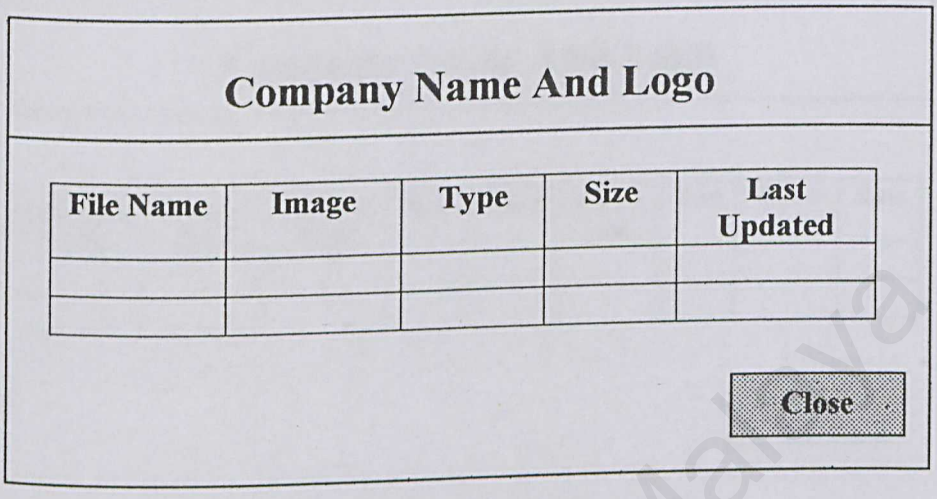


Figure 4.25 The View Image Page

When you click "Remove Image" (radio button) in the image library page, the remove image page will be displayed.

Figure 4.26 The Remove Image Page

When you click "Survey Report" (link) in the personnel page, the survey report page will be displayed.

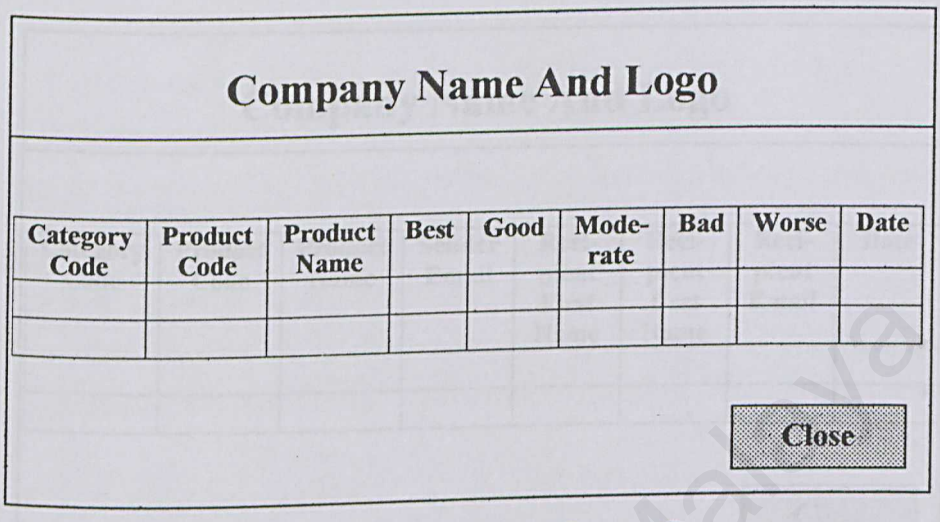


Figure 4.27 The Survey Report Page

When you click "Sales Report" (link) in the personnel page, the sales report page will be displayed.

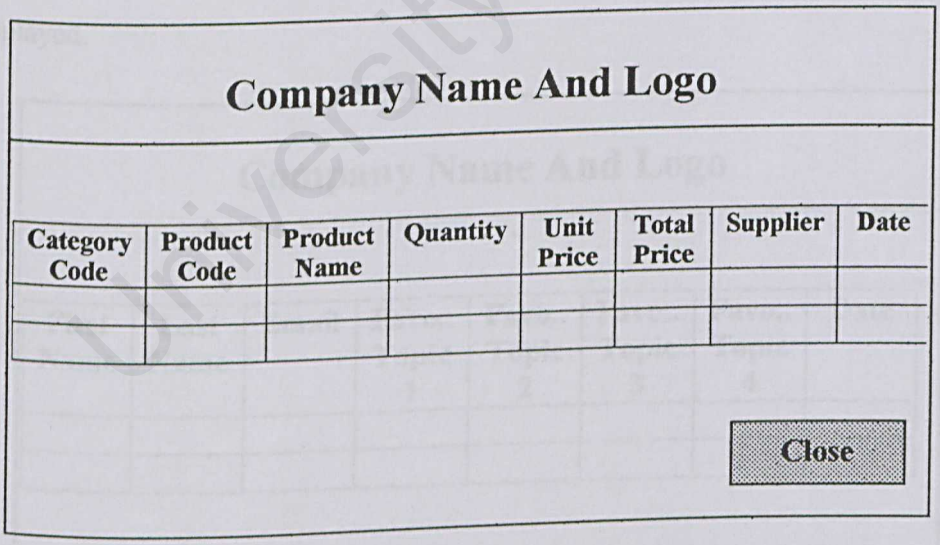


Figure 4.28 The Sales Report Page

When you click "Consumer Info" (link) in the personnel page, the consumer info page will be displayed.

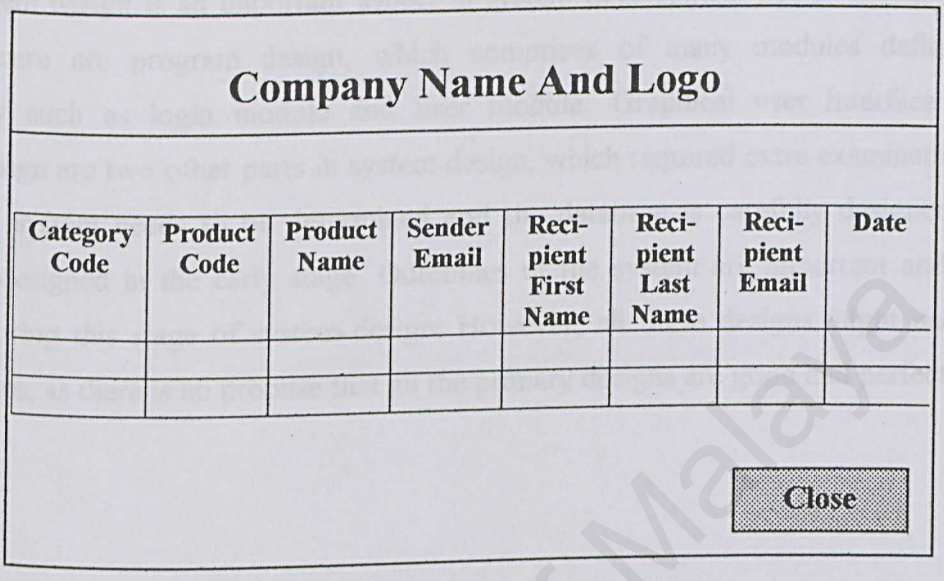


Figure 4.29 The Consumer Info Page

When you click "Consumer Favorite" (link) in the personnel page, the consumer favorite page will be displayed.

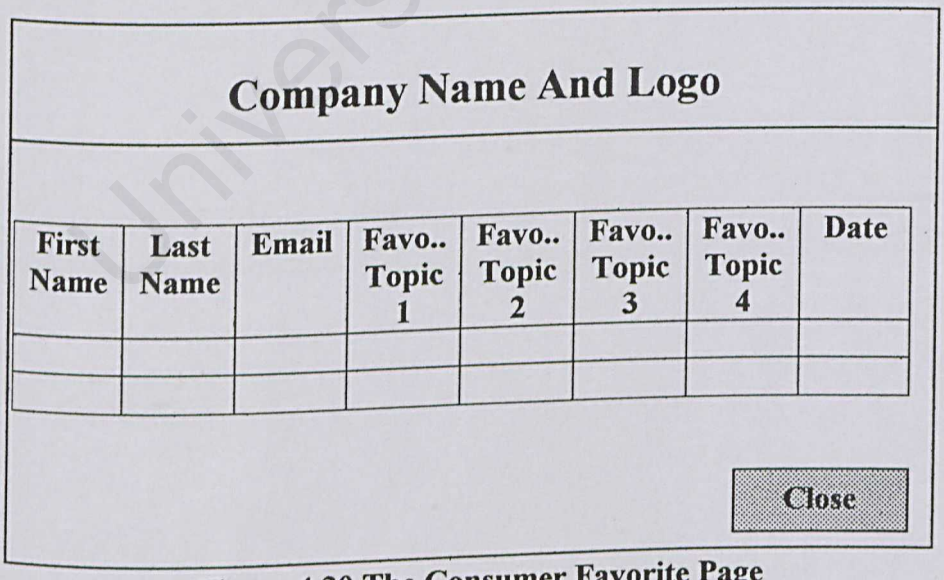


Figure 4.30 The Consumer Favorite Page

4.5 Summary

System design is an important aspect in system development cycle. Things that need to be taking care are program design, which comprises of many modules defined by their functionality such as login module and user module. Graphical user interface design and database design are two other parts in system design, which required extra examination. The data flow of the system needs to be determined and the database is carefully designed out of the framework designed in the early stage. Outcomes of the system are important and need to be predicted during this stage of system design. However, all these designs might need minor or major changes, as there is no promise that all the primary designs are good and perfect.

CHAPTER FIVE

System Implementation

Chapter 5 System Implementation

5.1 Introduction

System implementation is the physical realization of the database and application design. On completion of the design stages (which may or may not have involved prototyping), here comes the stage where the database and the application have to be implemented. The transaction process continues when a compiler accepts source code as input and produces machine-dependent object-code as output. Compiler output is further translated into machine code – the actual instruction that drives micro-coded logic in the central processing unit (CPU). So, coding and debugging is the major works involved in the implementation phrase.

In a software project, the requirements analysis, system design and implementation phases do not have a clear boundary. Each phase tends to overlap one another. This phase at times involves some modifications to the previous design.

5.2 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware and software will not only help to speed up the system development but also determine the success of the project. After implementing the system, the requirement of hardware and software that was stated in the previous chapter (Chapter 3) can be finalized. The final list of the hardware and software tools used to develop the entire system is listed below.

5.2.1 Actual Hardware Requirements

The hardware used to develop the system are as listed below:

- 166 MHz Intel Pentium Processor and above
- 64 MB RAM and above
- 2 GB Hard Disk with minimum of 650MB of free space PS/2 Keyboard
- Other standard desktop PC components

5.2.2 Actual Software Tools Requirements

5.2.2.1 Software Tools For Design And Report Writing

There are a lot of software tools, which can be used in designing and writing report. The design process involves the drawing of structure chart, data flow diagram and others that form the foundation of the software development. The purpose of this graphically logical design is to provide an overall view of system and interconnection between the modules. Visio Professional and Microsoft Word are the software that used to design and write report.

5.2.2.2 Software Tools For Development

During the Electronic Marketing system development, a vast array of software tools was used. Table below depicts the software used to develop the system.

Software	Purpose	Description
Microsoft Windows 2000 Professional	System Requirement	Operating System (OS)
Internet Information Server (IIS) 5.0	System Requirement	Web Server Host
Microsoft SQL Server 2000	Database	Build the database to store and manipulate the data
Microsoft Visual InterDev 6.0	System Development	Coding the web pages
Active Server Pages (ASP)	System Development	Coding the web pages
Hyper Text Markup Language (HTML)	System Development	Coding the web pages
Visual Basic Scripting Language (VBScript)	System Development	Coding the web pages
Java Scripting Language (JScript)	System Development	Coding the web pages
Microsoft Visual Basic 6.0	System Development	Build the Component Object Model (COM) to connect ASP and SQL
Internet Explore 5.0	System Development	Viewing the web pages
Macromedia Fireworks 4.0	User Interface Design	Button and image design and creation

Table 5.1 Software Tools Used For Electronic Marketing System

5.3 Platform Development

The platform development will include setting up the development environment, create project in Visual InterDev 6.0 and Visual Basic 6.0, create a database in SQL 2000 Server and configure the IIS server. Servers and development tools installations are the very first step before starting off with any development work. When using Microsoft's products, it is essential to know the sequence of products installations to ensure smooth execution without system errors.

5.3.1 Setting Development Environment

1. First, install Microsoft Windows 2000 Professional
2. Install Internet Information Server (IIS) 5.0
3. Install Microsoft Visual Studio 6.0 (included Visual Basic 6.0 and Visual InterDev 6.0)
4. Install Microsoft SQL Server 2000

5.3.2 Creating Project In Visual InterDev 6.0

After installing the Microsoft Visual Studio 6.0, a project named **emaketing** was created. The entire necessary script library can be getting from this project. The coding phase can be started now by adding ASP page into the project and begin to design the user interface according to the user interface design which have been done before.

5.3.3 Creating Project In Visual Basic 6.0

After installing the Microsoft Visual Studio 6.0, a project of ActiveX DLL named **emaketing** was created. Then, following by creating a class module for build the component object model (COM), which used to connect to database between ASP page and SQL server.

5.3.4 Creating Database In SQL Server 2000

The SQL server was installed in main server. A database named **emarketing** was created after the Microsoft SQL server had been installed successfully. Then, the tables created according to the database design. This database will become the database storage for the system. The tables were created for keeping the data used in all modules of the Electronic Marketing. Hard disk space is allocated for the database to maximize the performance of the SQL server and to ensure there is enough of space to store the record.

5.3.5 Configure Internet Information Server (IIS)

After installing the IIS, the virtual directory was created so that the user can access the application. The users can access the application through the following address. **http://SeverName/emarketing/default.asp**

5.4 Coding Approach

Coding is an iterative process whereby it is done until the programmer obtains the desired results. There are two types of coding approach, one is top-down and the other one is bottom-up. The bottom-up coding is based on coding some complete lower level modules and leaving the high-level modules merely as skeletons that are used to call the lower modules, whereas the top-down approach is the reverse.

Electronic Marketing was developed modularly using both the top-down and bottom-up approaches. By combining both approaches at different stages of coding, testing could be done on those completed modules while others are still being coded. Example of the coding can be found in Appendix. Comments are added in the code to provide a better understanding to the code.

5.4.1 Top-Down Approach

Top-down approach involves building the high-level software modules that are refined into functions and procedures. That means the higher-level modules to be coded first before the lower level modules. The codes in the lower modules contain only an entry and an exit. A module with such characteristic is called a shell. The higher-level modules will reference the lower ones if they are coded and available. Reference to a shell will result in an empty action.

This approach will ensure that the most important modules will be developed and tested first. It also gives a preliminary version of the system sooner.

Below is a diagram that describes the top-down approach for Electronic Marketing.

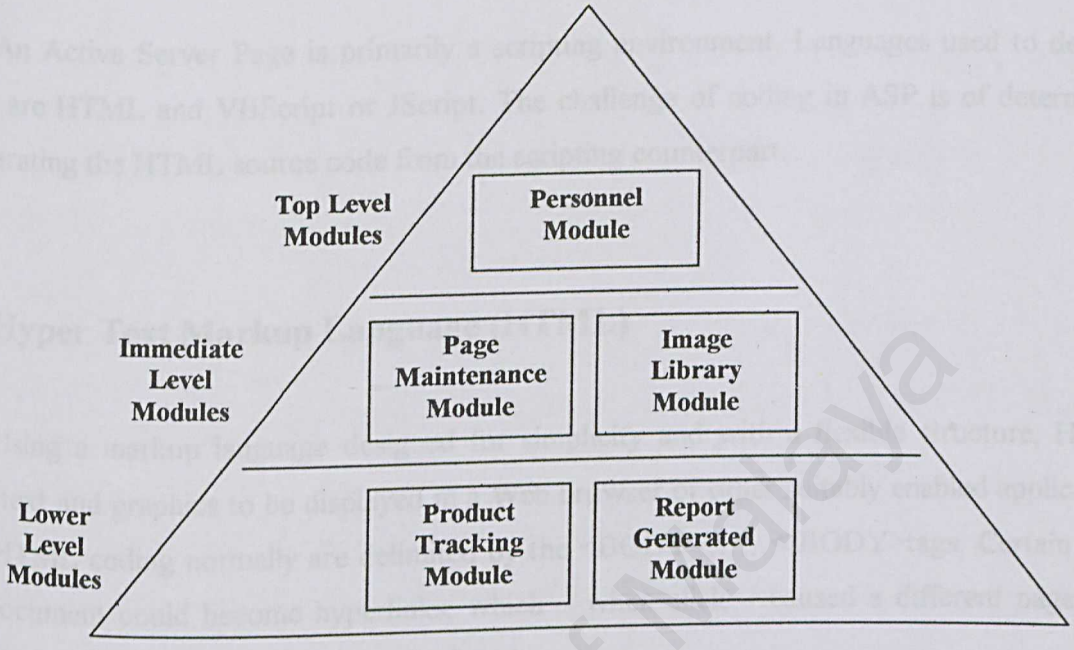


Figure 5.1 Top-Down Approach in Electronic Marketing

5.4.2 Bottom-Up Approach

As oppose to the top-down approach, the bottom-up approach begins with the coding of the lower level modules first before the higher level modules. However, the higher modules are just skeletons that call the lower modules. This approaches is used if the critically of lower level modules is high and need to be completed first to test their efficiency

5.5 Coding Style

An Active Server Page is primarily a scripting environment. Languages used to develop an ASP are HTML and VBScript or JScript. The challenge of coding in ASP is of determining and separating the HTML source code from the scripting counterpart.

5.5.1 Hyper Text Markup Language (HTML)

Using a markup language designed for simplicity and with a flexible structure, HTML allowed text and graphics to be displayed in a Web browser or other suitably enabled application. All the HTML coding normally are delimited by the <BODY>……</BODY>tags. Certain parts of the document could become hyperlinks, which – when click – caused a different page or a different section of the same page to be displayed.

5.5.2 Visual Basic Scripting Language (VBScript)

The scripting language used by the ASP application is specified by using the statement <%@ LANGUAGE="VBSCRIPT"%>. This statement is placed at the beginning of the ASP application. For client-side scripting, they must be delimited by the <SCRIPT LANGUAGE ="VBSCRIPT">……</SCRIPT> tags.

Below is an example taken from the project with file name as "image_remove.asp"

```
<script language="vbscript">
sub conbox(str)
        if confirm("Do you want to remove this image?") then
                window.navigate("image_remove.asp?fname="&str)
        else
                window.form1.reset()
        end if
end sub
</script>
```

These coding will display a confirmation window to inquiry the user whether wants to remove the certain image or not. If yes, window will pass to the image_remove.asp with the parameter fname=str.

5.5.3 Java Scripting Language (JScript)

Jscript can be used in ASP by use the HTML script tags <SCRIPT> and </SCRIPT>, together with the LANGUAGE = "JAVASCRIPT"

Below is an example taken from the project with file name as "image_remove.asp"

```
<script language="javascript">
function remove_All()
{
        if (confirm("Do you want to remove ALL files?"))
        {
                document.form2.action = "image_removeproc.asp";
                document.form2.submit();
        }
}
</script>
```

These coding will display a confirmation window to inquiry the user whether wants to remove the entire images or not. If yes, window will pass to the image_removeproc.asp.

5.5.4 Including Other Files

Server-side includes is a mechanism which use to insert information into a file prior to processing. ASP implements only the #INCLUDE pre-processing directive of this mechanism. This directive can be used to insert the content of another file into an .asp file before ASP processes the .asp file.

Use the following syntax: <!--#INCLUDE FILE = "*filename*"--> ,where FILE is the keyword that indicate the type of path which using to include the file, and *filename* is the path and file name of the file which want to include. Included files do not require a special file-name extension.

By using this mechanism, a shorter coding of .asp file can be produced. Meanwhile, programmers also do not have to do duplicate work, for written the same function, which is shared with several .asp files.

5.5.5 Getting Information From A User

Often programmers might want to get information from a user, for example, when the user submits information in forms. The ASP **Request** built-in object makes getting this information easy.

In this project, there are two associated collections of the **Request** object have been used. They are:

1. **Using the QueryString Collection**
   If the form method is POST, the **QueryString** collection contains all the information passed as a parameter after the question mark in the URL.

For example, when a user sends the following URL request, the **Request.QueryString** collection would contain two values: *name* and *age*.

<a href="myasp.asp?name=Charles&age=30">

The following script uses the **Request** object to access these values.

Welcome, <% = Request.QueryString ("name") %>.

Your age is <% = Request.QueryString ("age") %>.

In this case, the following text would be sent back to the user:

Welcome, Charles. Your age is 30.

2. **Using the Form Collection**

The **Form** collection contains all the values that a user entered in a form submitted with the POST method.

For example, when the user fills in and submits the following form:

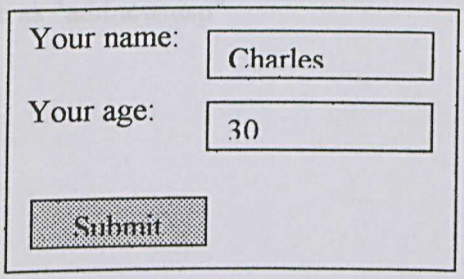
<form action="submit.asp" method="post">

<p> Your name: <input name="text1" size=48>

<p> Your age: <input name="text2" size=48>

<p> <input type=submit>

</form>



The following request is sent:

text1=Charles&text2=30

and the following script is returned by a results page (such as submit.asp):

Welcome, <% = Request.Form("text1") %>.

Your age is <% = Request.Form ("text2") %>.

which would result in the following output:

Welcome, Charles. Your age is 30.

5.5.6 Sending Information To A User

In this project, two methods of ASP built-in object **Response** have been used to control the information which send to a user by using the:

1. **Response.Write** method to send information directly to a browser.
2. **Response.Redirect** method to direct a user to a URL other than the requested URL

5.5.7 Listbox And Textbox Checking

Listbox and textbox checking is performed before record is inserted into the database. The purpose of this feature is to make sure that the necessary data have been inserted into the textbox or selected form the llistbox, before send the data into database.

Below is an example taken from the project with file name as "addnew.asp"

```
<form action="" method="post">
<input type="text" id=category name=category>
</form>
<script language="javascript">
if (form1.category.value = = "")
{
  alert(""Category Code" field cannot be blank!")
  form1.category.focus()
  return
}
</script>
```

These coding will check whether the textbox of category have been inserted or not. If no, a message box will display "Category Code" field cannot be blank!", then window will focus back on that textbox.

5.5.8 Data Validation

Data validation is performed before record is inserted into the database. The purpose of this feature is to make sure invalid data will not inserted into the database and cause error.

5.6 Database Connection

In this system, Component Object Model (COM) is used for connect database between ASP page and SQL server. The COM contains several functions that use for performed the data maintenance activities, such as add record, update record, delete record, select record and so on.

Below is an example of select record from database, which taken from the project with file name as "product.asp"

```
<%
    set obj = server.CreateObject("dbaccess.emarketing")
    set adors = server.CreateObject("adodb.recordset")
    constr = "provider=sqloledb; data source=sinyong; initial catalog=emarketing;
            user id=sa; password=;"
    rs = obj.Sel_Record(constr,"*","NewCategory","","","",adors)
%>
```

From these coding, first an object being created to connect to the COM. Then, a recordset was created to keeping the records. Following by creating a connection string, which link to the database of SQL server. Finally, the program will selected all the records from the table named NewCategory.

5.7 Error Handling

To ensure that the system handles errors gracefully, global and local functions were included in the codes.

Below is an example of add record into database, which taken from the COM.

```
Public Function Add_Record(lconstr As Variant, lFields As Variant, _
                           lFieldValues As Variant, lTable As Variant) As Variant
Dim cn As ADODB.Connection
On Error GoTo ErrHandler

  Set cn = New ADODB.Connection
  cn.Open lconstr
  cn.CursorLocation = adUseClient
  cn.BeginTrans
  If lFields = "" Then
    strsql = "set dateformat dmy; Insert into " & lTable & " values (" & lFieldValues & ")"
  Else
    strsql = "set dateformat dmy; Insert into " & lTable & " (" & lFields & ") values (" &
             lFieldValues & ")"
  End If
```

```
    cn.Execute strsql
    cn.CommitTrans
    Add_Record = True
    Exit Function

ErrHandler:
    cn.RollbackTrans
    Add_Record = "False | " & Err.Description
End Function
```

These coding will call to the errhandler if got error when running the Add Record function. An error description will be shown according to the error that occurred. If there is no error, the coding will continue running and return a "true" value for Add Record function.

5.8 Program Documentation

Program documentation is a set of written descriptions that explain to a reader what the programs do and how they do it. Internal documentation is a description material written directly within the code. It means that internal documentation refers to comments within the codes. Comments can explain the action, like a color commentary, which can be a great help in understanding the code. Whether as a teaching tool or to simply remind programmer what the code does, comments are best sprinkled liberally throughout a program.

For Visual Basic Scripting Language, there is an appropriate syntax for demarcating text as a comment. The comment tag is simply preceding the text with single code. Any text after this symbol ' will be ignored during execution time. All the comments are in green color.
For example:

```
' This is a comment.
```

For Java Scripting Language, the appropriate syntax for demarcating text as a comment is different from Visual Basic Scripting Language. For single line comments, simply precede the line with two backslashes. For multi-line comment blocks, begin the comment with /* and close with */. All the comments will be ignored during execution time and also in green color.
For example:

```
// This is a single line comment.
/* This is a multi-line line comment. */
```

Codes are also formatted to enhance understanding. Spacing or line brake in between different section of the codes will enhance readability too.

5.9 Module Implementation

There are two main modules in this system, Consumer Module and Personnel Module. The Consumer Module is divided into two sub-modules and the Personnel Module is divided into six sub-modules.

The sub-modules of the Consumer Module are Product List and Send Me Email.

1. **Product List** sub-module is for the consumer to select and find certain category of product. The link of the product list will bring consumer to a product profile which providing the product description and product price to let the consumer know more about this product. From here, consumer can purchase this product by adding it into Shopping Cart (link). They also can recommend this product to their friends by using Email To Friend (link). At the same, consumers are being encouraged to rate the product, which they have chosen before check out.

2. **Send Me Email** sub-module is for the consumer to fill up their personal details such as their name, email address and their favorite topic. So that, retailer is able to inform them when there are new products launch.

The sub-modules of the Personnel Module are Page Maintenance, Image Library, Survey Report, Sales Report, Email Information and Consumer Favorite.

1. **Page Maintenance** sub module is provided a small template for the purpose of maintains the web page. It is divided into two parts. First part is using to maintain the top banner of the web page. Second part is using to modify and maintain the online catalog. So, personnel are allowed to add in new products, edit description of the products and delete the product from the catalog.

2. **Image Library** sub module is provided a library for keeping all the images and pictures of the products. From here, personnel can view, upload and remove the images.

3. **Survey Report** sub module is generating a simple survey report from the result of rating products by consumers. From this report, personnel can view the popularity of each product.

4. **Sales Report** sub module is generating a sales report that shows the sales transactions that have been processed for each product. From this report, personnel can know the total price and the quantity of the product, which have been sold for certain period.

5. **Email Information** sub module is generating all the email addresses that have been collected from Email To Friend in Consumer Module. So that, personnel will able to analyze which population like that certain product and easy to contact them by sending email.

6. **Consumer Favorite** sub module is generating consumers' information from the data that have been entering by consumers when they are visiting the web site. Through this consumers' information, personnel will able to analyze the favorite of their consumers and easy to contact them when having great special promotions.

This system is user friendly with its simple forms and uniformity to enhance readability and ease of use.

5.10 Program Flow Diagram

A Program Flow Diagram (PFD) is a formalized graphic representation of a program logic sequence. In computer programming, PFD were formerly used to describe each processing path in a program (the main program and various subroutines that could be branched to). PFD involves the use of simple geometric symbols to represent the beginning or end of a program (an oval), a process (a rectangle), a decision (a diamond), or an I/O process (a parallelogram) and so on.

There are some examples of PFD can be found in Appendix. All these PFD are the formalized graphic representation of program logic sequence for Electronic Marketing System.

5.11 Summary

Under this stage, the design model of the Electronic Marketing is being turned into a workable product. Stages involved are setting development environment, system coding and modules implementation. In the next chapter, the testing of the final product is highlighted. It will show types of testing approaches used.

CHAPTER SIX

Testing

Chapter 6 Testing

6.1 Introduction

Many programmers view testing as a way to demonstrate how their program performs properly. However, the idea of demonstrating correctness is really the reverse of that testing is all about. We test a program to demonstrate the existence of a fault. Because our objective is to find faults, we consider a test successful only when a fault is discovered. This is achieved by using carefully planned test strategies and realistic data so that the entire testing process can be methodically and rigorously carried out. [14]

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and code generation. In this chapter, software testing fundamentals, testing strategies and software debugging methods will be presented.

Following are some of the objectives of software testing:

- Testing is a process if executing a program with the intent of finding an error.
- A good test case is noted that has a high probability of finding an as-yet-undiscovered error.
- A successful test is one that uncovers as-yet undiscovered error.

6.2 Fault

The objective of testing is to find error and fault. Fault identification is the process of determining what fault or faults caused the failure, and fault correction or removal is the process of making changes to the system so that the fault are removed. [14]

6.2.1 Types of Fault

When no obvious fault exists, program is tested to isolate more faults by creating conditions where the code does not react as planned. Therefore, it is important to know kind of faults to seek.

Faults can be categorized as below:

1. Algorithmic faults
2. Syntax faults
3. Documentation faults

6.2.1.1 Algorithmic Fault

Algorithmic faults occur when a component's algorithm or logic does not produce the proper output for given input because something is wrong with the processing steps. These faults are easy to spot by reading through the program (call desk checking) or by submitting input data from each of the different classes of data that we expect the program to receive during its regular working.

Typical algorithmic faults include:

1. Testing for the wrong condition.
2. Forgetting to initialize variables or set loop invariants.
3. Forgetting to test for a particular condition (such as when division by zero might occur).

6.2.1.2 Syntax Fault

Syntax faults can be checked while parsing for algorithmic faults. This will ensure that the construct of programming language is used properly. Microsoft Interdev does not come with a compiler to catch syntax faults before a web page is published. Therefore, syntax faults within web pages can only be traced after the web pages have been published.

6.2.1.3 Documentation Fault

When the documentation does not match what the application does, the application has documentation faults. Usually, documentation is derived from system design and provides a clear description of what the programmer would like to program to do, but the implementation of these functions is faulty. Such faults can lead to other faults later.

6.3 Test Planning

The purpose of having test planning is to help in designing and organizing tests, so that testing is carried out appropriately and thoroughly.

A test plan has the following steps:

1. Establishing test objectives

   At the beginning, we have to know what we are going to test on. So we have to establish our test objectives that tell us what kinds of test cases to generate.

2. Designing test cases

   After establishing test objectives, we begin to design the test cases that are used to test the system. If test cases are not representative and do not thoroughly exercise the functions that demonstrate the correctness and validity of the system, then the reminder of the testing process is useless.

3. Writing test cases

   After designing, we have to start writing the test cases.

4. Testing test cases

   At the same time, we also test the test cases.

5. Executing tests

   After all testing have been done, we execute our tests on the system.

6. Evaluating test results

   After executing tests, we evaluate the test results.

6.4 Testing Technique

To test a component, a range of inputs and conditions are chosen. The component of the software will be allowed to manipulate the data, and the output will be observed. A particular input is chosen will demonstrate the behavior of the code behind the entire GUI. A test point or a test case is a particular choice of input data to be used in testing program. However, the data are entered with the express intent of determining whether the system will process them correctly.

Different test cases are needed on different type of testing strategies. There are four categories of test cases that are created for testing purposes namely erroneous test data, normal test data, extreme test data and condition test data. These categories are further explained in the following section.

6.4.1 Erroneous Test Data

Using test data that are erroneous is a good way to determine how the system handles such errors and how it behaves under such situation. For example, an invalid file will not be allowed to be uploading into the image library of Electronic Marketing until the user gives a valid file format. For this case, the system will prompt the user "Invalid File Format". Therefore, an invalid file is use as erroneous test data.

6.4.2 Normal Test Data

The normal test case is use to check whether the system will work well under normal condition. That is means to test whether a given correct data will produce the expected results. For example, assume that there are four sales transactions happening on 1/1/2002. So, if a user want to generate a sales report on 1/1/2002, the system will pick up these four records in database. This type of test data serves as a preliminary test of the system.

6.4.3 Extreme Test Data

The extreme test data is use for exhaustive testing. Data that are out of the range specified will be used to test the system because errors may occur at the extreme point. For example, the system does not allow the user to upload a file, which its file name including file extension is more than 50 characters. This is because, the data maintenance can be done easily by having simple analyze file name.

6.4.4 Condition Test Data

The condition test case is use to check whether the system will work well under certain specify condition. This is because some functions may be active under certain condition, therefore a set of data are tested on all possible conditions. For example, a images that written as "new" will only display together with the product in the online catalog if that product is launched not more than 10 days.

Besides that, here also got some methods, which can be used for debugging ASP codes. They are:

a) **Comments**

Comments can be used for debugging by comment "out" sections of the code to prevent them from being executed. In doing so, the programmer may learn more about why a certain problem is occurring in the program.

b) **Method Of Response.Write**

The "Response.Write" command is inserted into the code to exam the value of the variable. This is to ensure that the value of the parameter is being passed correctly all the time.

For example:

```
<%
    category = Request.QueryString ("category")
    Response.Write ("category")          'This will print the value of the category
%>
```

c) **Method Of Response.End**

The "Response.End" command is inserted into the code to stop the execution of the code. In doing so, the programmer may easily find out the specific part of the program that occur error.

For example:

```
<%
    category = Request.QueryString ("category")
    Response.End          'The execution of the coding will stop here!
    Response.Redirect "product_selected.asp?category="&category
%>
```

6.5 Testing Strategy

Testing is a process of exercising or evaluating a system by manual or automatic means to verify that it has satisfied requirements or to identify differences expected and actual results. Testing is probably the least understood part of a software development project. A bug is any unexpected, questionable, or undesired aspect or behavior displayed, facilitated or caused by the software being tested. Testing can uncover different classes of errors in a minimum amount of time and with a minimum amount of effort. The strategies used for testing are unit testing, module testing, integration testing and system testing.

6.5.1 Unit Testing

Historically, quality software is relied on testing each function or module. Unit testing is sometimes referred as function testing or component testing, which is extremely time-consuming. For Electronic Marketing, unit testing was done during the coding phrase.

The first step is to examine the program code by reading through it, trying to spot algorithm, data and syntax faults. Then, followed by comparing the code with specifications and with the design to make sure that all relevant cases have been considered. Next, the browser is used to view the web pages or result and then eliminate remaining syntax faults if necessary. Finally, test cases are developed to show that the input is properly converted to the desired output.

Unit testing involves the tests on each function module independently. If error is found, debugging of the codes will be carried out immediately. If the compilation of the function module is completed successfully, another function module will be coded. The following steps specify how unit testing is carried out for this system:

1. **Examining The Code**

   The code of the program is examined by reading through it to spot for algorithmic faults and syntax faults. This method is useful to identify faults that have been left out by the programmer.

2. **Control Objects Testing**

   Command buttons are clicked to test their functionality and text boxes are tested with different data types and also null value to make sure invalid data will not cause any fault.

3. **Different Data Type Testing**

   Different data types like numbers, characters or date is used to test certain function because some control objects will only accept certain data type, invalid data type can be traced by the system without causing any error.

4. **Choosing Test Cases**

   Test cases are developed to ensure that the input is properly converted to the desired output. So, to test a component, input data and condition are chosen. Then the component is allowed to manipulate the data, and output is observed.

6.5.1.1 Example Of Unit Testing

There were too many unit test cases involved. Therefore, only a few will be shown as example.

Unit Test Case Example 1

The Add Record function in this system is used to add new record into database. Unit Testing was carried out to ensure that the record was added successfully. Table below shows the test case for unit testing on the function of adding the record.

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Add a new category product for example files into New Category table.	The record is inserted permanently.	Record is inserted successfully.

Table 6.1 Test Case For Adding Record

Unit Test Case Example 2

The Update Record function in this system is used to update the existing record in database. Unit Testing was carried out to ensure that the record was being updated successfully. Table below shows the test case for unit testing on the function of updating the record.

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Click the Edit button to modify the data that has selected form database.	The records are updated permanently.	Records are updated successfully.

Table 6.2 Test Case For Updating Record

6.5.2 Module Testing

A module is a collection of dependent components. A module encapsulates all of the related components. Module testing enables each module to be tested independently. This testing will ensure that the module calling sequence in this project is systematic.

In module testing, two or more units in which either unit that use output data from or provide input data for another unit were tested in collection. These units have related characteristics to perform a common goal or function such as the search engine function which comprised of SQL statement generating, query form submission, and displaying query results.

6.5.2.1 Example Of Module Testing

There were too many module test cases involved. Therefore, only a few will be shown as example.

Module Test Case Example 1

The Upload Images function in this system is used to upload images, which used to create online catalog. Module Testing was carried out to ensure that the image was being uploaded successfully. Table below shows the test case for module testing on the function of uploading image.

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Choose the Upload Images function.	Link to the page of uploading images.	Link to the page of load images successfully.
2	Browse the image that wishes to upload.	The path of the image will be shown and the image can be previewed.	The path of the image will be shown and the image can be previewed successfully.
3	Click the Ok button to upload the image.	The image is uploaded permanently.	The image is uploaded successfully and can be view through the View Images function.

Table 6.3 Test Case For Uploading Image

Module Test Case Example 2

The Sales Report function in this system is used to generate the sales report for certain period. Module Testing was carried out to ensure that the record was being generated successfully. Table below shows the test case for module testing on the function of generating sales record.

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Choose the product that wish to generate.	The category code, sub-category code and product code will be selected out.	The category code, sub-category code and product code showed out successfully.
2	Set the duration time that wish to generate.	The sales records will be generated.	The sales records are generated successfully.

Table 6.4 Test Case For Generating Sales Report

6.5.3 Integration Testing

When the individual components are working correctly and meet the objectives, these components are combined into a working system. In other words, integration testing is the process of verifying that the system components work together as described in the system and program design specifications. This integration is planned and coordinated so that when a failure occurs, some idea of what caused it can be got.

Sandwich integration testing approach is used for this system. This approach combines top-down integration with bottom-up integration. The testing starts from the login screen of the system and down to the lowest level of the form functions and from the form function back to the catalog screen of the system. This testing is repeated several times to make sure that all the control objects work properly.

The motive behind this testing is to make certain that all modules can be executed as a complete module. As mentioned earlier, an individual module calls other module to perform certain tasks. Parameters will be passes among these modules and if not tested, then parameter may be passed incorrectly.

6.5.3.1 Example Of Integration Testing

There were too many integration test cases involved. Therefore, only a few will be shown as example.

Integration Test Case Example 1

The product catalog is being created in the Personnel Module and then displayed them in Consumer Module. Integration Testing was carried out to ensure that the catalog was being displayed successfully. Table below shows the test case for integration testing on the function of creating and displaying product catalog.

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Choose the product that wishes to create catalog	The template of the product catalog will be shown.	The template of the product catalog is being shown successfully.
2	Choose the criteria of the main body for the product catalog such as Font Size, Font Color… and then submit.	The record is inserted permanently.	Record is inserted and the product catalog is created successfully.
3	Select the category product that wishes to view.	The product catalogs that under this category are selected out.	The product catalogs that under this category are showed out successfully.

Table 6.5 Test Case For Creating And Displaying Product Catalog

Integration Test Case Example 2

The consumer favorites from the Send Me Email function in Consumer Module are being submitted into database and then generated in Personnel Module. Integration Testing was carried out to ensure that the record was being inserted and generated successfully. Table below shows the test case for integration testing on the function of inserting and generating consumer favorites.

Step	Test Procedure	Expected Output	Test Result Analyzing
1	Fill in the consumer favorites of the Send Me Email function and then submit.	The record is inserted permanently.	Record is inserted and successfully.
2	Click the Consumer Favorites Sub-Module	The consumer records will be generated.	Consumer records are generated successfully.

Table 6.6 Test Case For Inserting And Generating Consumer Favorites

6.5.4 System Testing

The last testing procedure done is system testing. Testing the system is very different from unit testing, module testing and integration testing. The objective of unit testing, module testing and integration testing is to ensure that the code has implemented the design properly. In other words, the code is written to do what the design specifications intended. In system testing, a very different objective is to be achieved, that is to ensure that the system does what the users want it to do.

Electronic Marketing is involves two kinds of system testing. They are function testing and performance testing.

6.5.4.1 Function Testing

Function testing is based on the system functional requirements. In other words, a function test is used to check that whether the integrated system performs its functions as specified in the requirements. The testing is carried out for two main modules in this system. The two modules are Consumer Module and Personnel Module. Each module is tested individually to determine whether the system performs as required.

6.5.4.2 Performance Testing

Performance testing addresses the nonfunctional requirements of the system. That means once the functions are convinced work as specified, the performance test compares the integrated components with the nonfunctional system requirements. The types of performance tests are:

a) **Compatibility Tests**

This test was performed to find out that the interface functions perform according to the requirements. The accuracy of data retrieval was high in this system. Besides, the speed of data retrieval was acceptable too.

b) **Human Factors Tests**

This test was performed to investigate requirements dealing with the user interface to the system. In this system, simple forms and related messages are displayed to determine user friendliness. These tests are sometimes called **usability tests**.

c) **Recovery Tests**

This test was performed to address response to the presence of faults or to the loss of data, power, devices or services. This testing was done, where some of the critical services like IIS Admin Service and SQL Service Manager were stopped, and the system recovered properly after rebooting of computer.

d) **Security Tests**

This test was performed to ensure that the application fulfills the security requirements. Such as verify the protection mechanism in the system against improper penetration and unauthorized access.

e) **Timing Tests**

This test was performed to evaluate the requirements dealing with the time to respond to a user and time to perform a function. The response time of this system is acceptable.

f) **Volume Tests**

This test was performed to address the handling of large amounts of the data in the system. The fields and records are checked to see if they can accommodate all expected data. Besides, the system also must be make sure that it reacts appropriately when data sets reach their maximum size.

6.6 Summary

Testing is one of the important steps in developing a system. Precision and accuracy of output data is considered during this process. Unit, module, integration and system testing has been carried out for the Electronic Marketing system. These testing approaches lead to delivering a quality system to users. The objective of a system will only achieve after all the thorough testing done by different user with different aspects.

CHAPTER SEVEN

System Evaluation

Chapter 7 System Evaluation

7.1 Introduction

After all the handwork of designing and developing as well as implementing Electronic Marketing, the end product of the project is brought up for evaluation. They were many evaluation techniques that used to evaluate the final system. The following section will explain in detail about the system strength and its limitation. Some future enhancements are used to enhance the performance of this system.

7.2 Problem Encountered And Solution

The following are the major problems encountered from the beginning of the project through the end of the system development process.

- **Difficulties In Choosing A Development Technology, Programming Language and Tools**

  There are many software tools available to develop a web-based database system currently as stated in the earlier chapters. Choosing a suitable technology and tool was a critical process as all tools have their strengths and weaknesses. In addition, the availability of the required tools for development is also a major consideration.

  Solution:

  In order to solve this problem, advises and views were sought from project supervisor, course mates and even seniors engaging in similar project. Furthermore, surfing the Internet and visiting the library helped to clarify some doubts.

- **Set Up the Development Environment**

  The operating system needed to run this project is Microsoft Windows 2000 Professional. However, Windows 98 was preinstalled in the computer that is used for system development. So, the computer has to be formatted. Furthermore, the set up of the server are critical for the operation of the application development. Therefore, the setup process took a long time because lacked of experience. Besides, the repeated failure of the server required re-installation as a remedy and this consumed time and effort.

  Solution:

  This difficulty is solved with the assistance of my friends, those who had experienced to set up such development environment.

- **Slow Processing Time**

  There is an online catalog features under Electronic Marketing System. As such, application created using many images and animation gif to attract users and thus more memory is required to compile and execute the application.

  Solution:

  Although it is documented that the minimum memory requirement in developing Electronic Marketing System is 64 MB, but personally a memory of 256 MB is much preferred.

- **No End User Evaluation**

  Since there is no really end user to test Electronic Marketing System except evaluation from Puan Norizan, I do not really know how end-user will react to Electronic Marketing System.

  Solution:

  Tests were done on other course mates.

- **Problems occur during integration**

  Since the system we handled is a group project, we face most of the problems while doing integration.

  Solution:

  The co-ordination between the group members is mainly important. A lot of details have to be discussed before start developing system especially the database design. Some design needs to be change to integrate the system based on logic thinking and design.

7.3 System Strengths

Below are the strengths of Electronic Marketing System:

- **Security**

  There are 3 types of users in Electronic Marketing System: the Manager Marketing, the Staff of Marketing, and Consumer. Each user type is allocated certain access rights to the functions in this system. For example, only the Manager Marketing and Staff of Marketing are allowed to create online catalog and generating summary report. By the way, login is required from them before using the system. That means they have to login from Electronic Office before entering to Electronic Marketing. Therefore, functions that are restricted to the user will be disabled. By incorporating these security features in Electronic Marketing System, the possibility of an unauthorized access will be greatly reduced. Furthermore, it also prevents intruders from intentionally or unintentionally causing vast damages to the system.

- **Scalability**

  Hardware and applications could be easily added to the existing system without influence the existing applications. This was because the system was not hardware-dependent.

- **Simple and User-Friendly Interface**

  Electronic Marketing System is specially designed on the principle for ease to use; therefore, all forms are kept simple. The inclusion of graphic user interface has contributed vastly to aid users. So, the learning curve is foreseen to be short and a user will be able to use the system with ease within minutes.

- **Web Enabled**

  The system was based on the web technology. It was using the client server approach that allowed processing load to be shared between the client and the server, thus reducing the burden on the server and allow it to provide better service.

- **Provide Database Maintenance**

  Users are able to do housekeeping for database maintenance. They can create, add, modify, update and delete the information of category, sub-category and product. Therefore, the database will not accumulate with a lot of useless data. This can reduce the storage used of the database.

- **Provide Template of the Website**

  The template is allowed users to create and maintain the company's websites. It is designed to be simple to use and the instructions are easy to follow. The steps of creating and maintaining websites are all template-driven. All users have to do are choose the image, pick the color, fill in information and the wizard will do the rest for them.

- **Report Generating**

  Electronic Marketing System is able to generate summary reports. Users are able to view their reports based on the category code, sub-category code, product code and date chosen. These reports are all in text form.

- **Display Process Message**

  There are a lot of processes between the system and its database, therefore, it is important to inform the user what the system has done when clicking on any command button. Messages like 'The new category have been added successfully.' or 'The new category have been exists in the database. If you want to edit the category, please go to edit.' will be displayed to inform the user. Without these messages, user might think that the system is faulty if no results are returned when a command is executed. In addition, user also knows that record is inserted into the database successfully.

- **Incorporates Data Validation**

  Data validation is done prior to insert record into the database. All the fields in the form will be checked for null value or invalid data type. With this feature, error when inserting record into the database will not occur. Error message will also be prompted to the user if important field is not filled or invalid data being input.

- **Implements Error Handling**

  To avoid run time error, this system is developed with error handling. Error message will be displayed when the system encounters exceptions and it will not terminate suddenly.

7.4 System Constraints And Limitations

Below are the constraints and limitations of Electronic Marketing System:

- **Browser Limitation**

  This system can only run in Internet Explorer 4.0 and above. This is because the system requires a browser that can understand VBScript, the default supporting language for ASP. User uses browsers that do not support these features will not be able to use the functions available in this system

- **Slow Response Time**

  If there are a lot of records in the database, the searching process will take more time because the system has to search through the database and then generate the search results in a report for the user. Another condition is the system will has to take some time for loading a web page, which contains a lot of images especially the online catalog.

- **Template Limitation**

  There only provides one type of layout in the template for maintain the main body and the top banner of the web page. Besides, there is no template built for maintain the left navigation and footer of the web page.

- **No Link To Related Website**

  There is no linking to the other website that related to the product which promote in the online catalog.

- **Language Limitation**

  This system only supports single communication language, which is English.

7.5 Future Enhancements

Future enhancement can be done to make the system more advances in order to improve the quality of the system and easier to use. A system development knows no boundaries as new requirements and better implementation methods continue to arise and evolve. There are several enhancements that could extend after developed the system.

- **Extent the Ability of Browser**

  As stated, Electronic Marketing System requires Internet Explorer 4.0 or above for execution. In future, Electronic Marketing System can be turned to fulfill other browser requirements such as Netscape Navigator for execution. This is because Netscape has a sizeable share in the browser market besides Internet Explore and Netscape has a lot of users in the world.

- **Using More Memory**

  Although it is documented that the minimum memory requirement in developing Electronic Marketing System is 64 MB, but a higher memory is much preferred to increase the processing time and fast response to information retrieval.

- **Various Type of Template**

  The online catalog will become more attractive and interactive if the template allows the users to choose more than one type of template layout. Template for maintains the left navigation and footer of the web page also should be added into the system. The page should be updated for a certain period to give the users a fresh and greater look.

- **Linking to Related Website**

  The system should provide some useful links for the users to link to other shopping web site and the site related to the stock market price.

- **Support Multi Lingual**

  The current system is only limited to one language. Therefore, it needs to be enhanced to support more than one language. This is because different organization is using different type of language

- **More Modules and Functions**

  Adding more modules and functions, for example, providing a Forum session, generating Top Ten Sellers, preparing a Wish List feature, having Help module and so on. Moreover, enhanced the reports generating to be showed out in both text form and also bar graph.

7.6 Knowledge And Experience Gained

From the beginning of this project until the final documentation, a number of problems have occurred and experiences are learned from there. The following are some of the knowledge that I gained from the project

- **The Importance of All Phases in SDLC**

  System analysis is an important phase in the system development life cycle (SDLC). This phase capture user requirements and the goal of the system. If this phase is wrong defined, it will cause faulty to the system development and later progress. With a complete and thorough system analysis, the system that is developed will fulfill all the requirements and achieve its goal.

  System testing is also an important phase in SDLC. There is no application that is free of error in this world. However, with the procedures in this phase, errors and faults in the system can be minimized. The functionality of each module or form can also be tested and confirmed that it meets the user requirements.

- **Development Tools Knowledge**

  Developing this system has given me the opportunity to learn Microsoft Visual InterDev 6.0, Microsoft Visual Basic 6.0 and Microsoft SQL Server 2000. Microsoft Visual InterDev 6.0 is used to create ASP where all the coding of interface design and functionality are written here. Meanwhile, ActiveX DLL is created through Microsoft Visual Basic 6.0. It is used to connect between ASP and SQL Server. Microsoft SQL Server 2000 is a database program

which suitable for Electronic Marketing System due to able to store a large amount of records in the database.

Reading about these software is not enough to understand its characteristic. By developing this system, I learn more about these software characteristics and those characteristics cannot be gain from reading books.

- **The importance of communications and discussion among the group members**

  Since IBS is a group project, which includes 8 different modules, the co-operation and co-ordinations among us is very important. I learn to be more co-operative and tolerance in the group in order to complete this project. Working in a group work seems to be more challenging since we have to discuss with everybody in the group before any decision was make. Able to work in a group project is a big advantage for me when I explore to the work environment in the future.

- **Self Expression**

  Developing Electronic Marketing System has really given me a great chance to express myself in designing and coding of the system. Finally, before graduating, I have the chance to build application software by myself. Doing this project has greatly improved my self-esteem and self-confidence.

7.7 Summary

Evaluation of a system is indeed needed to ensure its objectives and intended functions have been achieved. This chapter covers all the aspect of evaluating application software. At the end of evaluation, comes the conclusion of this thesis project.

7.8 Conclusion

Overall, the Electronic Marketing System has achieved and fulfilled the objectives and requirements as a web-based system as determined during system analysis. Anyone who needs to create and publish products promotion or collects the information of consumer for his or her organization can use this system. This system will help users to create and maintain online catalog and gather the information of consumer from any PC connected to the Internet with a web Browser. The system generates timely, accurate and relevant information. The feasibility of the system depends on how much the organization will benefit from its implementation.

Definitely, there was a lot of knowledge gained throughout the development of this system. This includes knowledge in web application development, programming, concepts and challenge to develop a system alone. Programming using ASP, VBScript, JScript and HTML proved to be a valuable experience. Even though programming skills and techniques are important in development, good software engineering techniques must also be applied. Here, theories and knowledge gained throughout the course of computer science studies like system analysis, design and software engineering were literally put into practice. It gives me a strong foundation to take this project as long as to complete it.

Finally, there are much more rooms for improvement in this system, especially in terms of implementing a more satisfactory system. With the first step taken, enhancements could still be made with more features added for future version.

All in all, this thesis has armed me with invaluable knowledge and experience. As a result, I am better prepared to face future challenges in life. There are more things to learn and experience in this fast growing world of information age. One has to constantly update oneself to keep up with the changing technology.

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http://searchdatabase.techtarget.com/sDefinition/0,,sid13_gci214291,00.html

[76] What is PHP?
http://www.php.net

[77] Programming : PHP
http://hotwired.lycos.com/webmonkey/programming/php/index.html

[78] Programming : ColdFusion
http://hotwired.lycos.com/webmonkey/programming/coldfusion/

[79] CFML
http://searchdatabase.techtarget.com/sDefinition/0,,sid13_gci541046,00.html

[80] Access 2000
http://www.microsoft.com/office/access/default.htm

[81] SQL
http://www.microsoft.com/sql/default.asp

[82] SQL
http://searchdatabase.techtarget.com/sDefinition/0,,sid13_gci214230,00.html

USER MANUAL

OF

ELECTRONIC MARKETING SYSTEM

Abstract

The purpose of this user manual is to provide some helpful guideline and usage about this Electronic Marketing System to the user.

Electronic Marketing System can be divided into two main modules – Personnel Module and Consumer Module.

Personnel have full access rights to the system. They can add, modify, update and delete records of category, sub-category and product. Personnel are responsibility to create and maintain the website of organization. They can view the summary reports through this system too.

Consumers have limited access to this system. They can visit the website which created by personnel and search their favorite product. Product purchasing process will be continue to Electronic Sales System and consumers can recommend the product to their friend.

Table Of Contents **Page**

List Of Figures **Page**

User Manual Of Electronic Marketing System

Introduction

The Electronic Marketing System was a web-based system, designed as an informative site for the outsiders. It responsibility in doing the online advertising and promotion activities, market survey and maintain communication between organization and consumers.

This system is accommodating to users from different levels. Electronic Marketing System contains two sub-modules; that are personnel module and consumer module. Using different login identity, users will be accessing to either personnel's function and interface or consumer's function and interface.

Electronic Marketing is one of the modules of Integrated Business Solutions (IBS) developed under ERP concept. The login function is control by Electronic Office, another module of IBS. So, each user has to logon to Integrated Business Solutions website (the main page of Electronic Office) before entering into Electronic Marketing.

Chapter 1 Login To System

1. Connect to the network.
2. Logon to Integrated Business Solutions website.
3. The fields that are required for the login are 'User ID' and 'Password'. However, only personnel, who want to enter Personnel Module, are required to login the system due to ensure the unauthorized access.

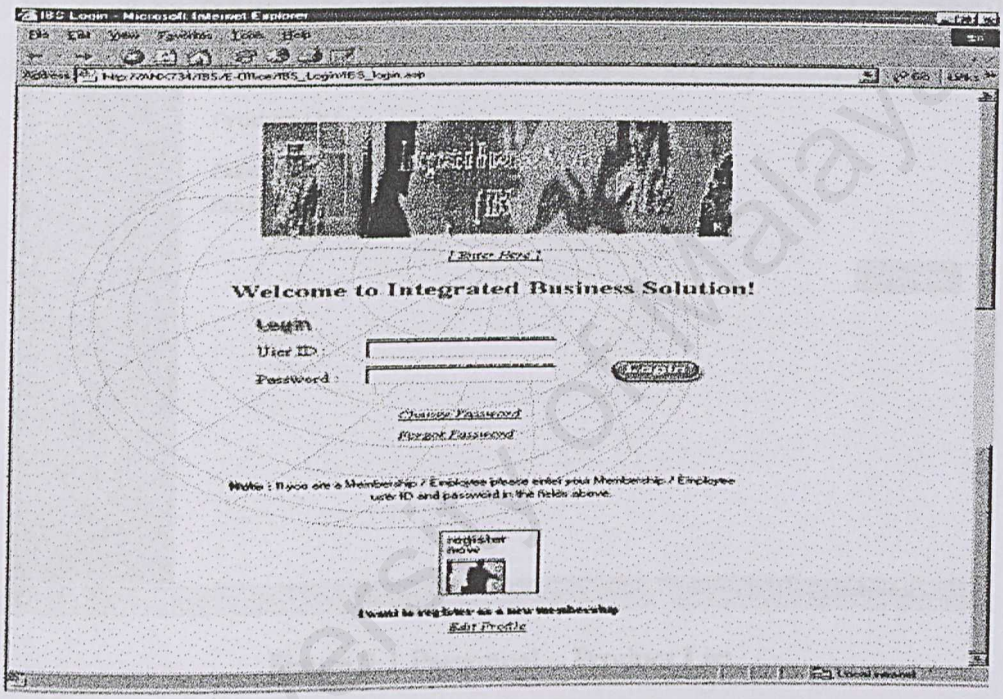

Figure 1.1 IBS - Login

4. After passing the authentication check, the authorized user is allowed to enter into the Personnel Module.
5. For consumer, they are excepting from login.
6. If consumers want to enter Electronic Marketing System, they just have to click on the image named "Integrated Business Solution" or press the link named "Enter Here". Then they will be brought into Consumer Module.

Chapter 2 Personnel Module

When a user login as Marketing Manager or staff of Marketing, he or she will enter into Personnel Module. The page will be shown as below.

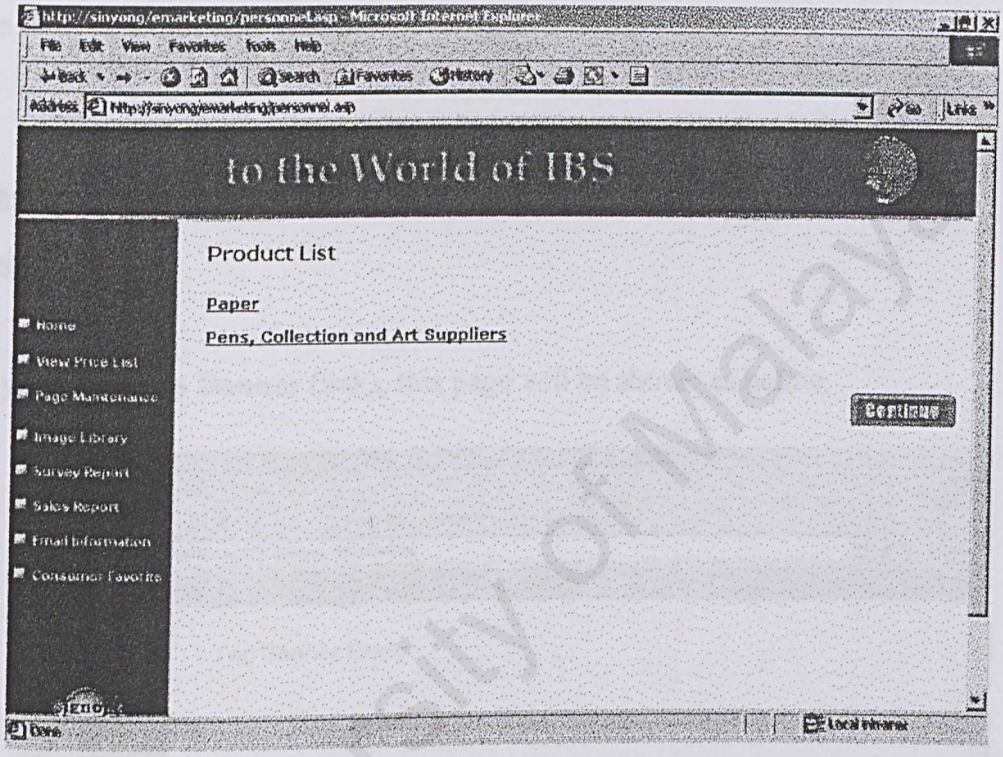

Figure 2.1 Personnel – Product List

There are eight sub modules at the left navigator. Each sub module has its own function. Explanation for each sub module (link) will be presented as below.

2.1 Home

1. When you press **Home** (link), all the links of product will be shown as Figure 2.1.
2. Each link will bring you to the catalogs, which have been created before.

2.2 View Price List

1. When you press **View Price List** (link), it will link to Electronic Inventory System by opening a new window.
2. The information of the products includes product name, description, price, supplier and so on will be showed in this new window.

2.3 Page Maintenance

2.3.1 Top Banner

1. When you press **Top Banner** (link), this page will be shown as below.

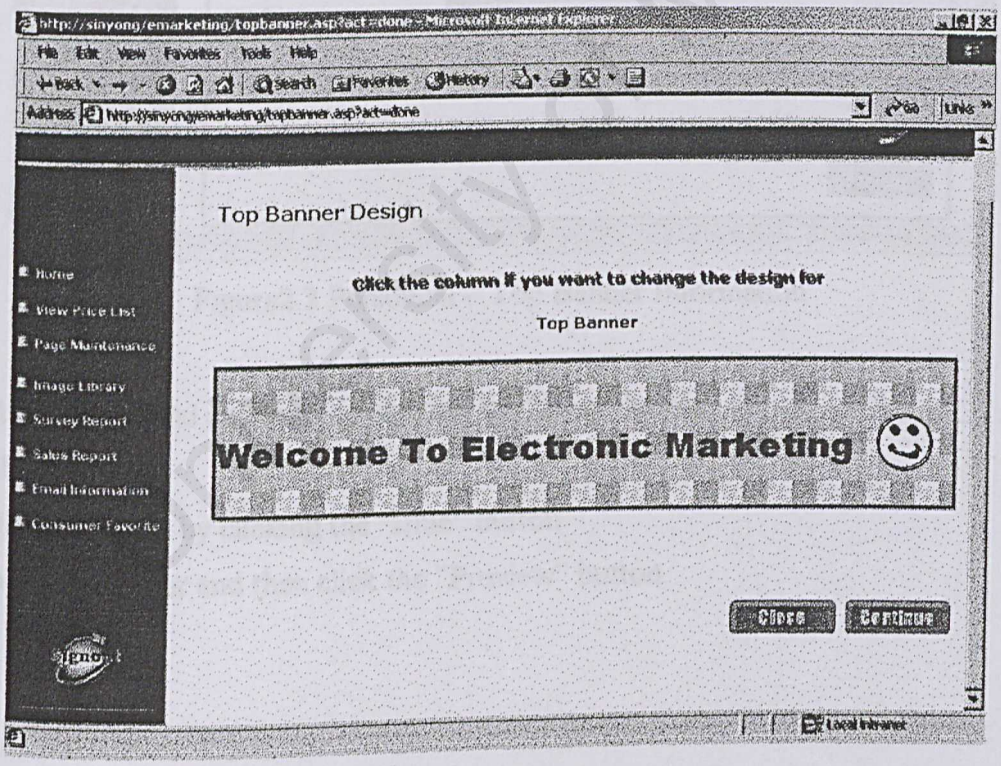

Figure 2.2 Personnel – Top Banner

2. In Figure 2.2, if you want to edit the design of top banner, click the column.

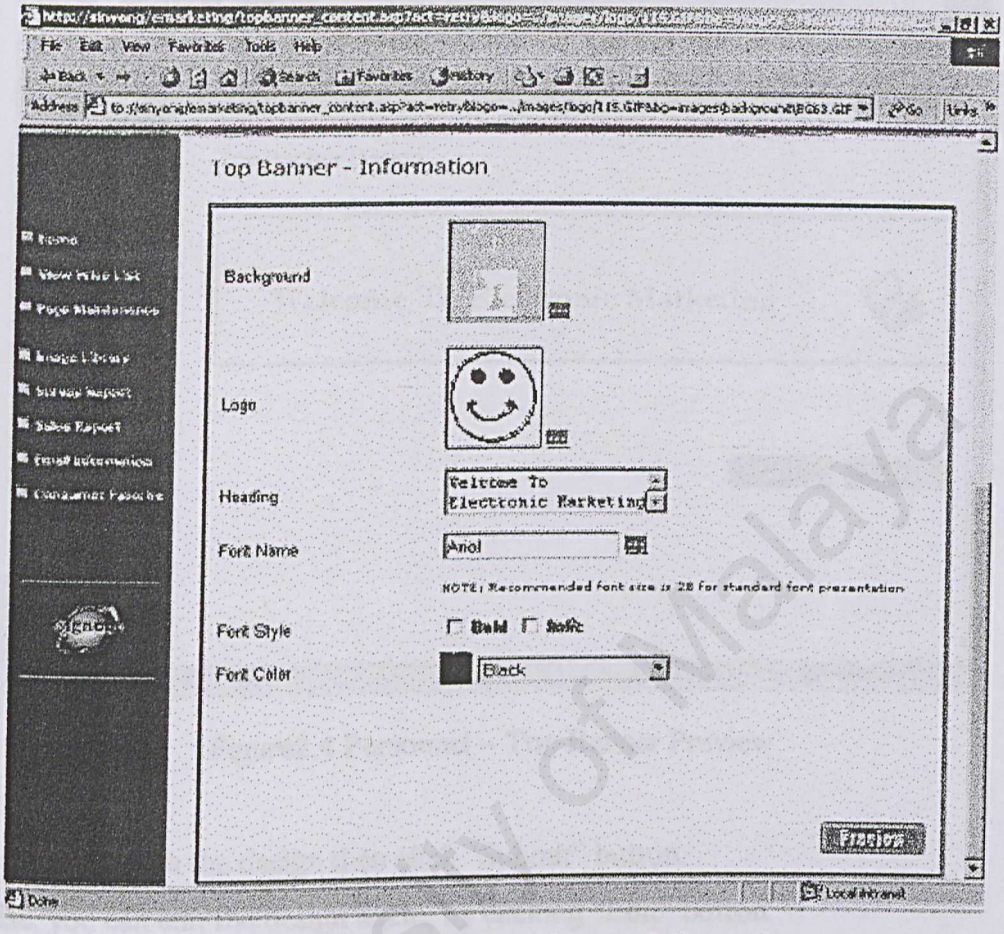

Figure2.3 Personnel – Top Banner Information

3. Select the background and logo by clicking the "Blue" button.
4. Fill in the heading.
5. Select the font name by clicking the "Blue" button
6. Choose the font color and then click the "Preview" button.

Figure2.4 Personnel – Top Banner Preview

7. If you are satisfy with the design then click "Submit" button.
8. Otherwise, you can edit the design again, by clicking "Edit" button.
9. After submit, you are back to the page of "Personnel – Top Banner" show as Figure 2.2
10. Click "Close" button to back to **Home** (Figure 2.1) or click "Continue button to go to **Main Body**.

2.3.2 Main Body

When you press **Main Body** (link), this page will be shown as below.

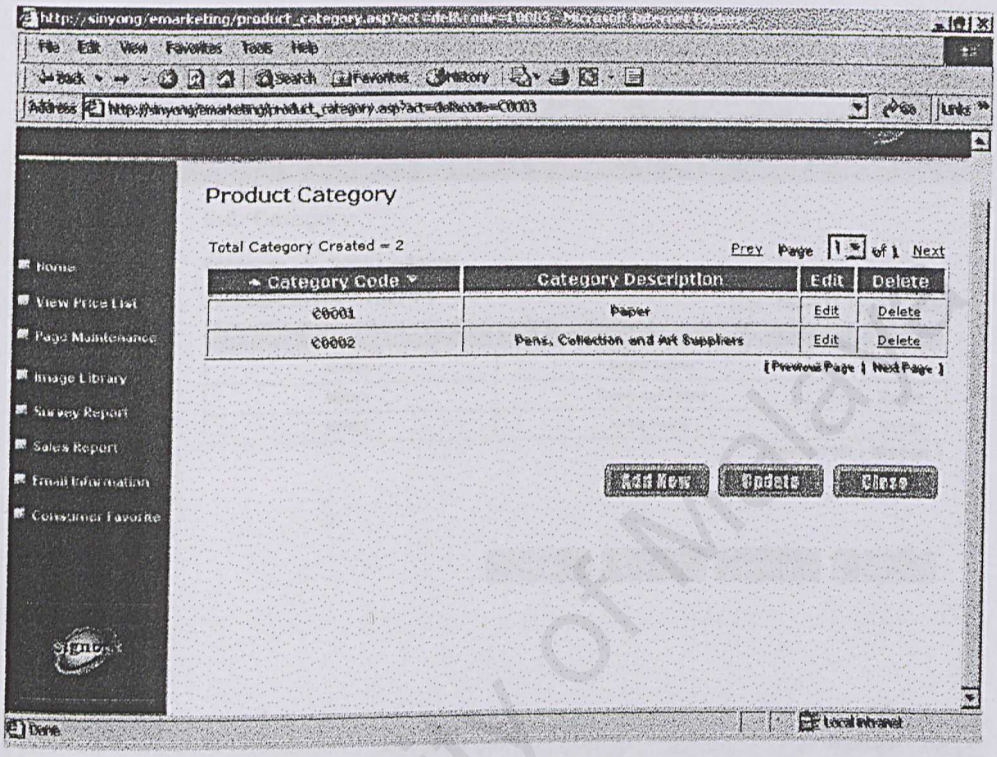

Figure2.5 Personnel – Product Category

There are four main functions in **Main Body**. They are:

(a) Create catalog

(b) Add new category, sub-category and product information for creating catalog

(c) Update category, sub-category and product information for creating catalog

(d) Delete category, sub-category and product information, that means delete the related catalog altogether at the same time.

2.3.2.1 Create Catalog

1. In Figure 2.5, choose the product category that you want to edit its catalog, then press "Edit" link.

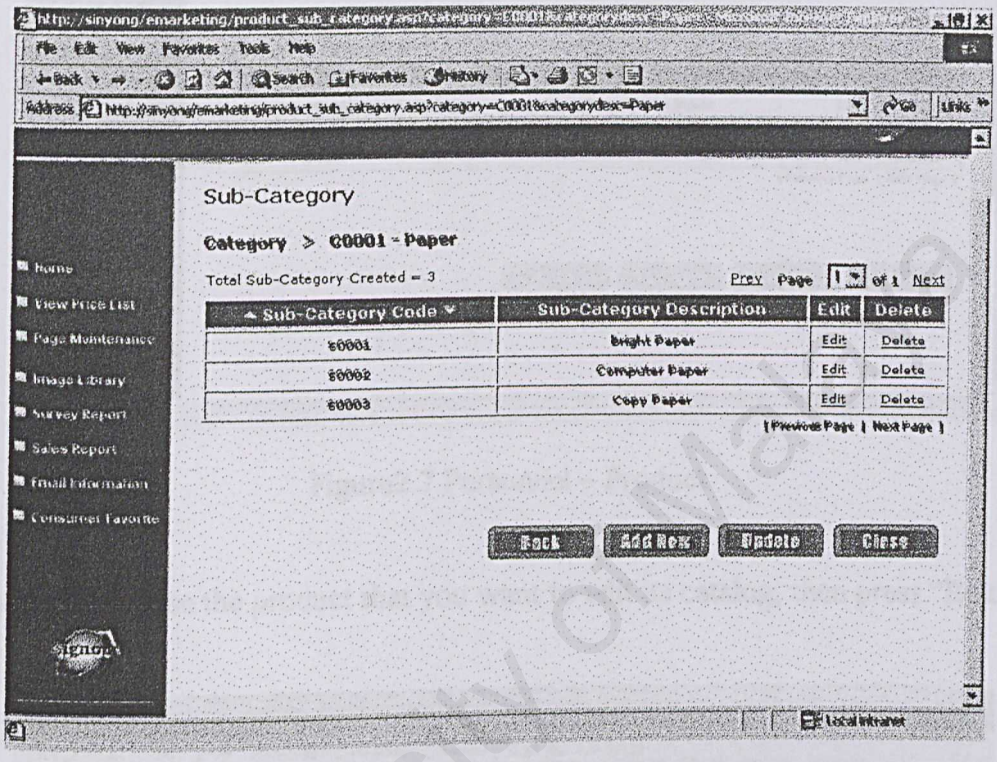

Figure2.6 Personnel – Sub-Category

2. In Figure 2.6, choose the sub-category that you want to edit its catalog, then press "Edit" link.

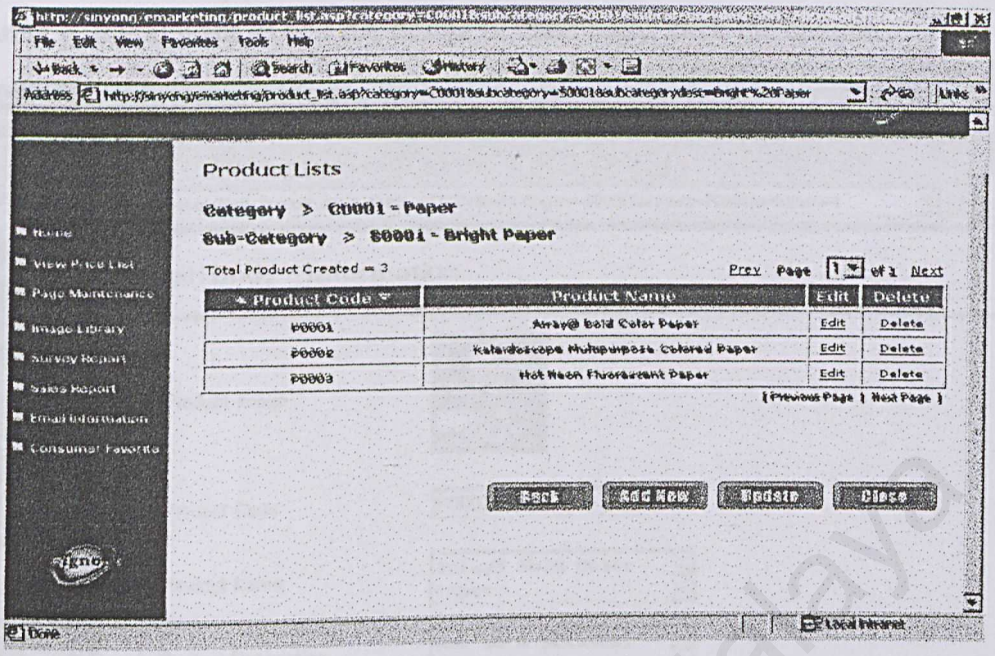

Figure2.7 Personnel – Product

3. In Figure 2.7, choose the product that you want to edit its catalog, then press "Edit" link.

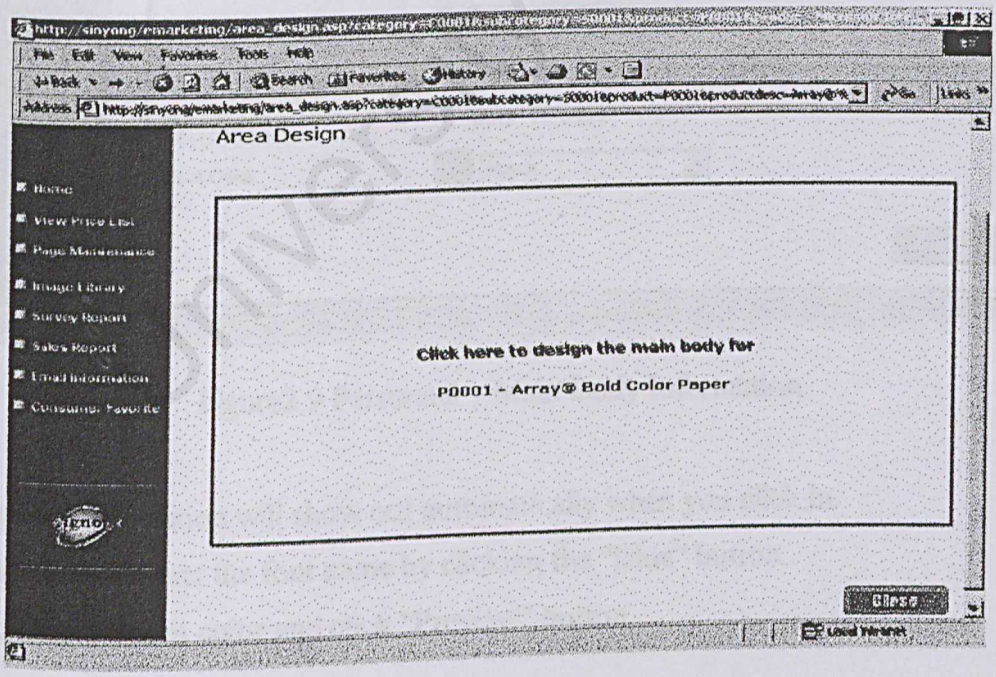

Figure2.8 Personnel – Main Body

4. In Figure2.8, if you want to edit the design of main body, click the column.

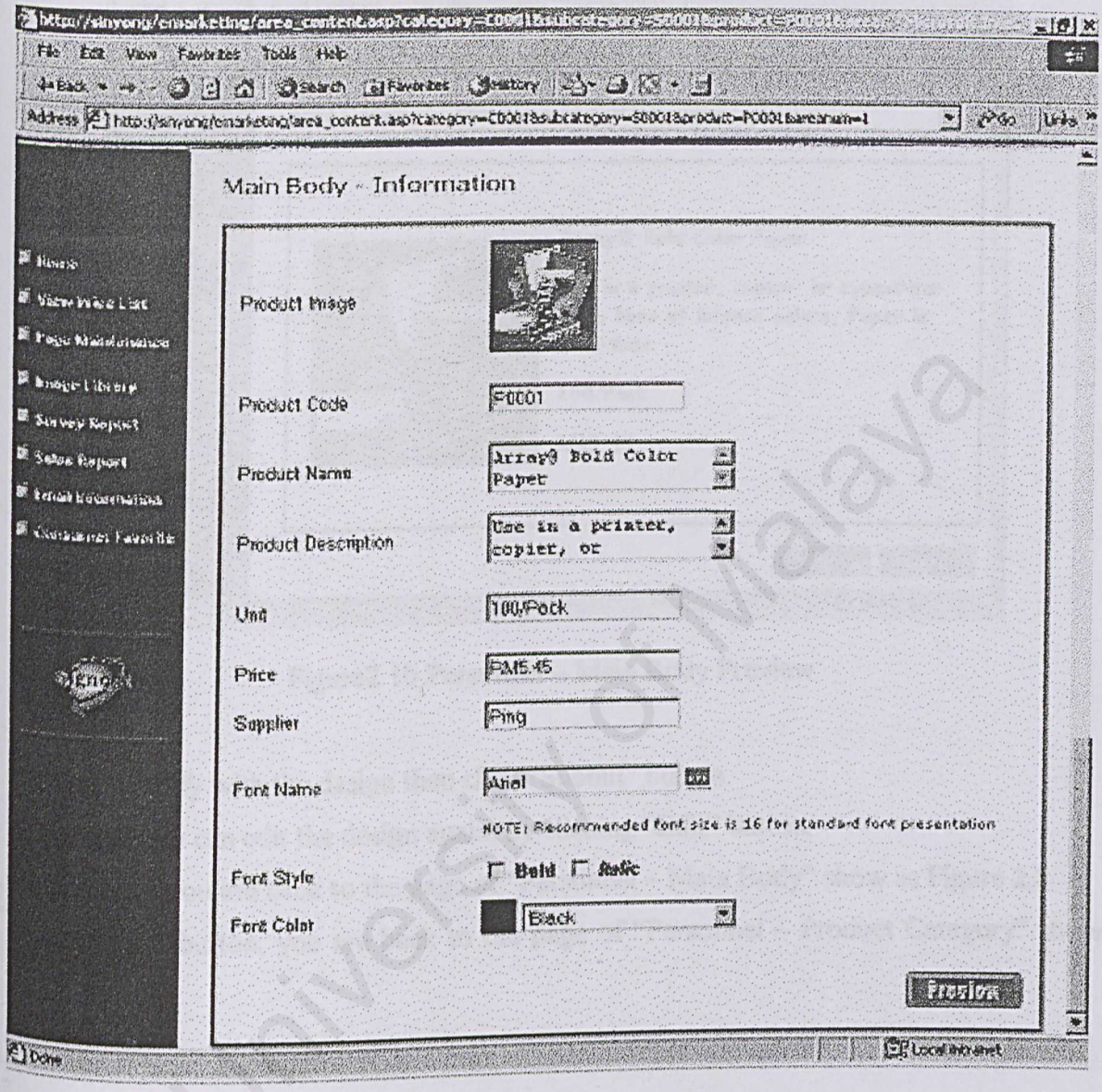

Figure2.9 Personnel – Main Body Information

5. The product information will show out automatically when you click in.
6. You just have to select the font name by clicking the "Blue" button.
7. Then, choose the font color and click "Preview" button.

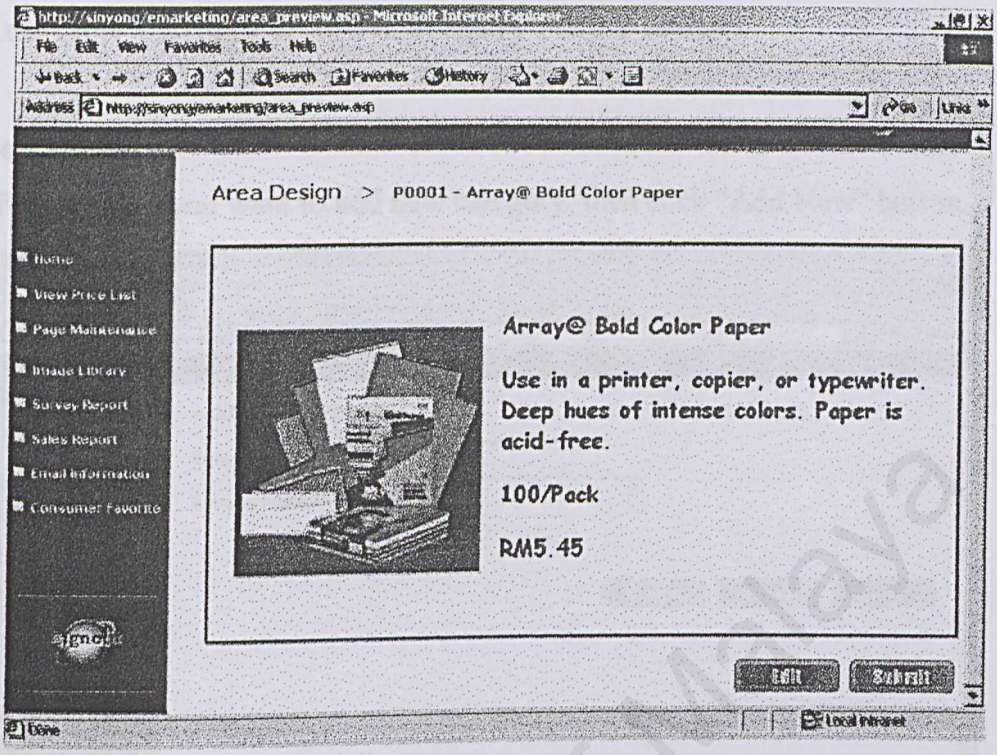

Figure2.10 Personnel – Main Body Preview

8. If you are satisfy with the design then click "Submit" button.
9. Otherwise, you can edit the design again, by clicking "Edit" button.
10. After submit, you are back to the page of "Personnel – Main Body" show as Figure 2.8
11. Click "Close" button, you are back to the page of "Personnel – Product Category" show as Figure 2.5

2.3.2.2 Add New Category, Sub-Category And Product

(a) Add New Category

1. In Figure 2.5, if you want to add new category, then click "Add New" button.

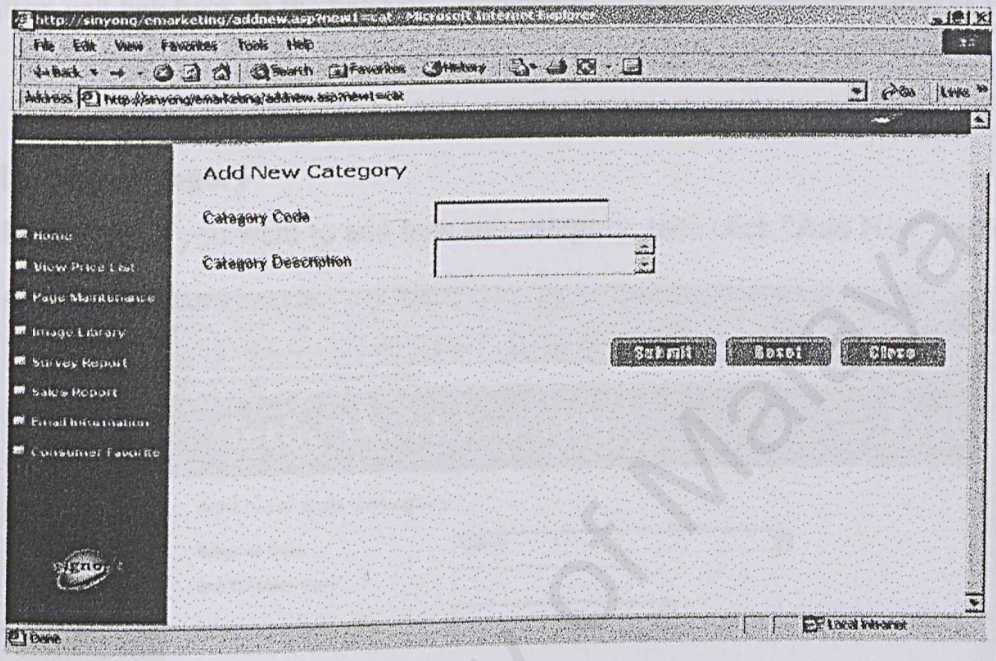

Figure2.11 Personnel – Add New Category

2. Fill in the new category information, then click "Submit" button.
3. A confirmation message box will pop-up with "Are you sure to add this new category?".

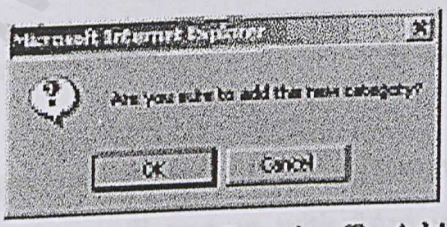

Figure2.12 Personnel – Confirmation To Add New Category

4. Click "OK" button to proceed or click "Cancel" button to abort.
5. If this new category is added successfully into the database, then message of **"The new category has been added successfully."** will be displayed.

6. In contrast, if this new category is not added successfully into the database, then message of "**The new category has been exists in the database. If you want to edit the category, please go to edit.**" will be displayed.
7. In Figure 2.11, "Reset" button is used to reset the text boxes into blank and "Close" button will link back to the page of "Personnel – Product Category" show as Figure 2.5.

(b) Add New Sub-Category

1. In Figure 2.6, if you want to add new sub-category, then click "Add New" button.

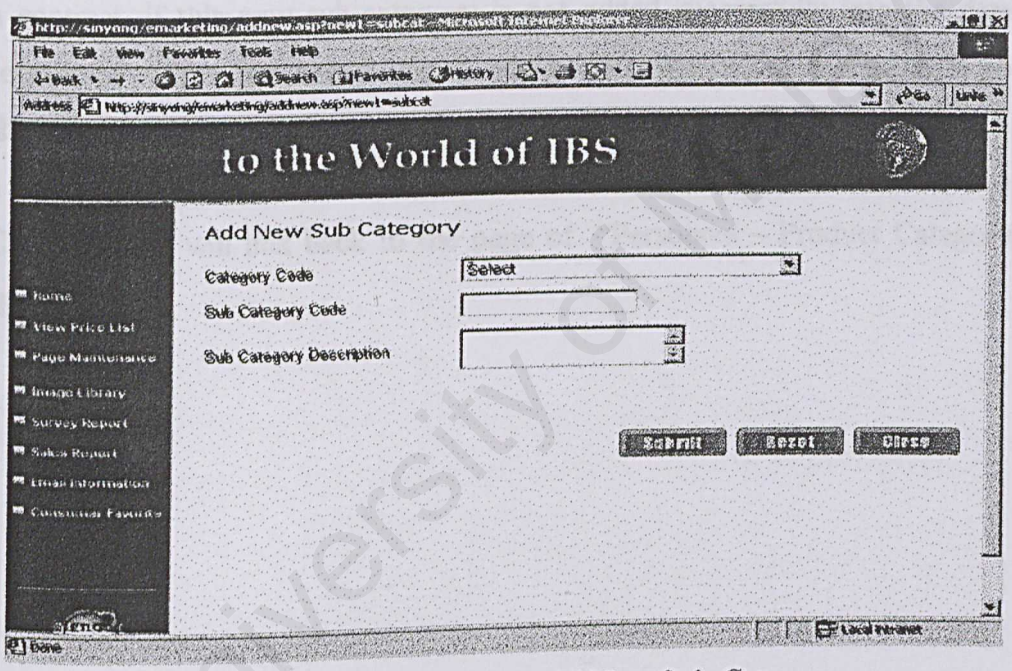

Figure2.13 Personnel – Add New Sub-Category

2. Fill in the new sub-category information, then click "Submit" button.
3. A confirmation message box will pop-up with "Are you sure to add this new sub-category?".

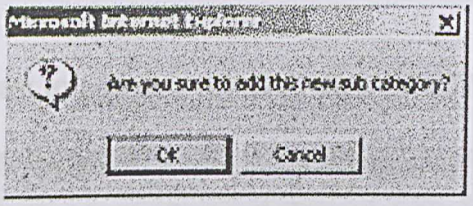

Figure2.14 Personnel – Confirmation To Add New Sub-Category

4. Click "OK" button to proceed or click "Cancel" button to abort.
5. If this new sub-category is added successfully into the database, then message of "**The new sub-category has been added successfully.**" will be displayed.
6. In contrast, if this new sub-category is not added successfully into the database, then message of "**The new sub-category has been exists in the database. If you want to edit the sub-category, please go to edit.**" will be displayed.
7. In Figure 2.13, "Reset" button is used to reset the text boxes and list box into blank and "Close" button will link back to the page of "Personnel – Product Category" show as Figure 2.5.

(c) Add Product

1. In Figure 2.7, if you want to add new product, then click "Add New" button.

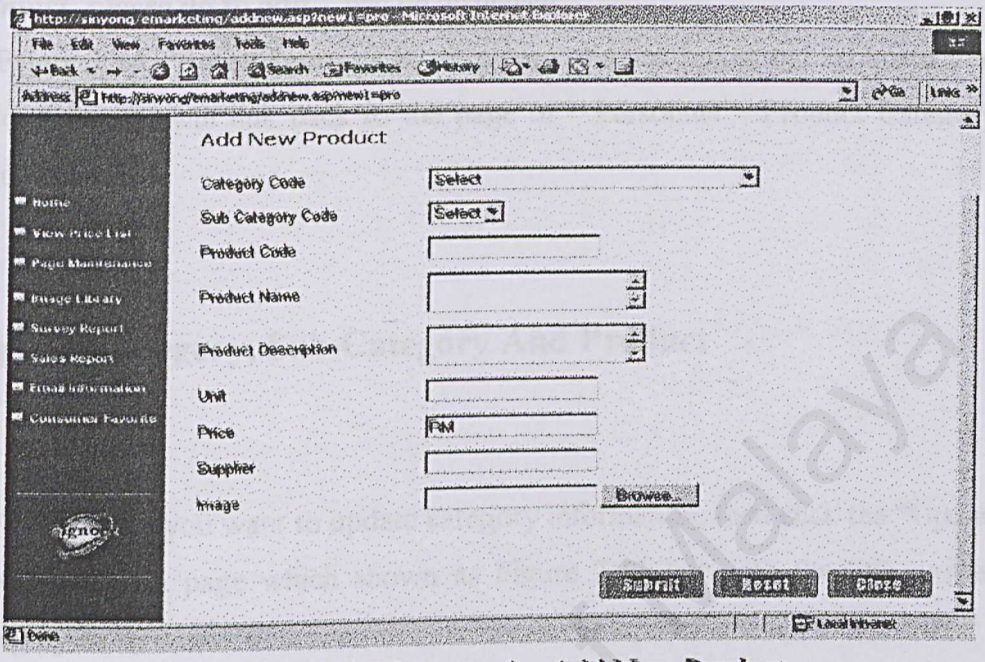

Figure2.15 Personnel – Add New Product

2. Fill in the new product information, then click "Submit" button.
3. A confirmation message box will pop-up with "Are you sure to add this new product?".

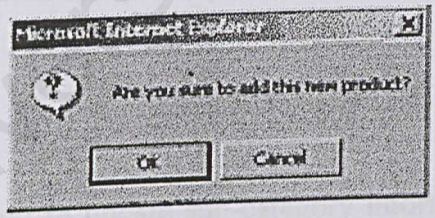

Figure2.16 Personnel – Confirmation To Add New Product

4. Click "OK" button to proceed or click "Cancel" button to abort.
5. If this new product is added successfully into the database, then message of **"The new product has been added successfully."** will be displayed.

6. In contrast, if this new product is not added successfully into the database, then message of "**The new product has been exists in the database. If you want to edit the product, please go to edit.**" will be displayed.
7. In Figure 2.15, "Reset" button is used to reset the text boxes and list boxes into blank and "Close" button will link back to the page of "Personnel – Product Category" show as Figure 2.5.

2.3.2.3 Update Category, Sub-Category And Product

(a) Update Category

1. In Figure 2.5, if you want to update category information, then click the "Update" button.
2. It will link to a page which shown as Figure 2.11 but with the title written as "Edit Category In Database"
3. Select the category code, and then the information of the category will be displayed.
4. Edit this information and click "Submit" button.
5. This new information will update the existing record in database, and a message of "**The category details is updated successfully**" will be displayed.

(b) Update Sub-Category

1. In Figure 2.5, if you want to update sub-category information, then click the "Update" button.
2. It will link to a page which shown as Figure 2.13 but with the title written as "Edit Sub-Category In Database"
3. Select the category and sub-category code, and then the information of the sub-category will be displayed.
4. Edit this information and click "Submit" button.

5. This new information will update the existing record in database, and a message of "**The sub-category details is updated successfully**" will be displayed.

(c) Update Product

1. In Figure 2.5, if you want to update product information, then click the "Update" button.
2. It will link to a page which shown as Figure 2.15 but with the title written as "Edit Product In Database"
3. Select the category, sub-category and product code, and then the information of the product will be displayed.
4. Edit this information and click "Submit" button.
5. This new information will update the existing record in database, and a message of "**The product details is updated successfully**" will be displayed.

2.3.2.4 Delete New Category, Sub-Category And Product

(a) Delete Category

1. In Figure 2.5, if you want to delete category, then press "Delete" link.
2. A confirmation message box will pop-up with "Confirm to delete the Main Body for Category Code _____?".

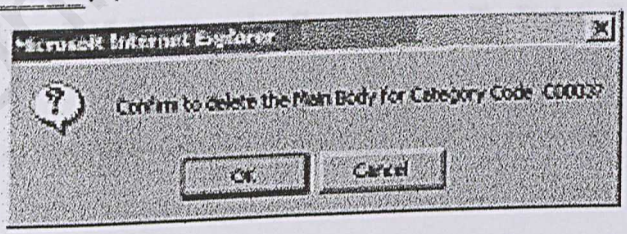

Figure2.17 Personnel – Confirmation To Delete Category

3. Click "OK" button to proceed or click "Cancel" button to abort.

(b) Delete Sub-Category

1. In Figure 2.6, if you want to delete sub-category, then press "Delete" link.
2. A confirmation message box will pop-up with "Confirm to delete the Main Body for Sub-Category Code _____?".

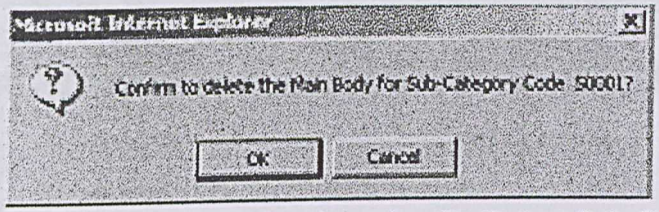

Figure2.18 Personnel – Confirmation To Delete Sub-Category

3. Click "OK" button to proceed or click "Cancel" button to abort.

(c) Delete Product

1. In Figure 2.7, if you want to delete product, then press "Delete" link.
2. A confirmation message box will pop-up with "Confirm to delete the Main Body for Product Code _____?".

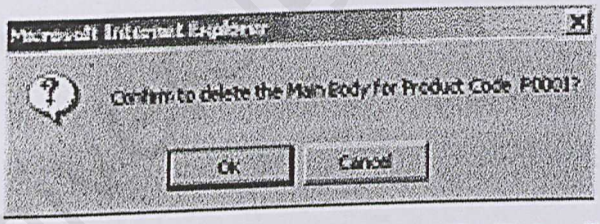

Figure2.19 Personnel – Confirmation To Delete Product

3. Click "OK" button to proceed or click "Cancel" button to abort.

2.4 Image Library

When you press **Image Library** (link), this page will be shown as below.

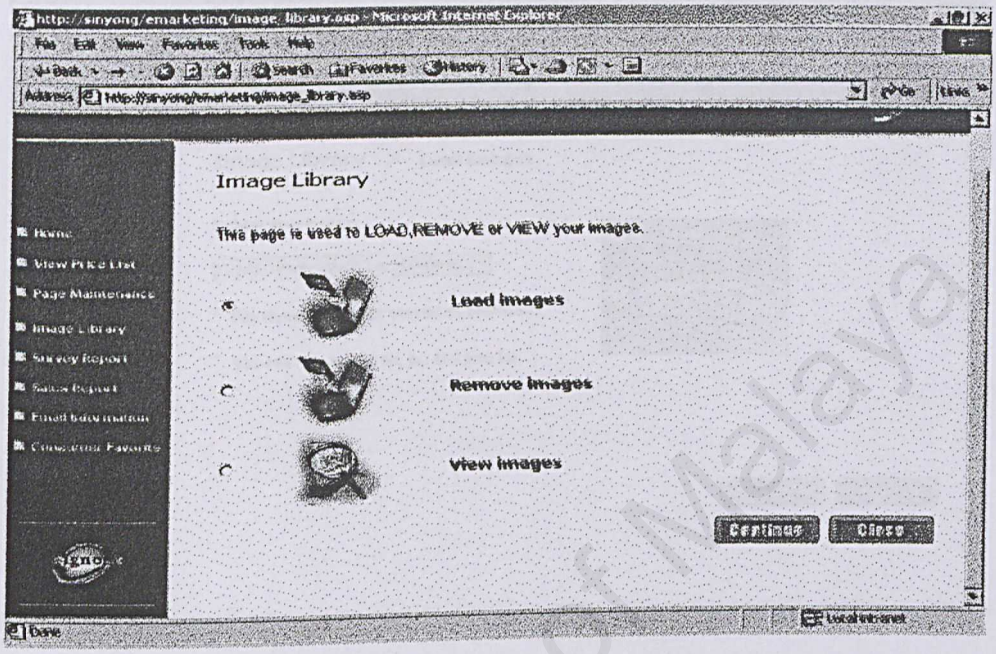

Figure2.20 Personnel – Image Library

There are three main functions in **Image Library**. They are:

(a) Load Images

(b) Remove Images

(c) View Images

2.4.1 Load Images

1. In Figure 2.20, choose the radio button of "Load Images", then click "Continue" button.

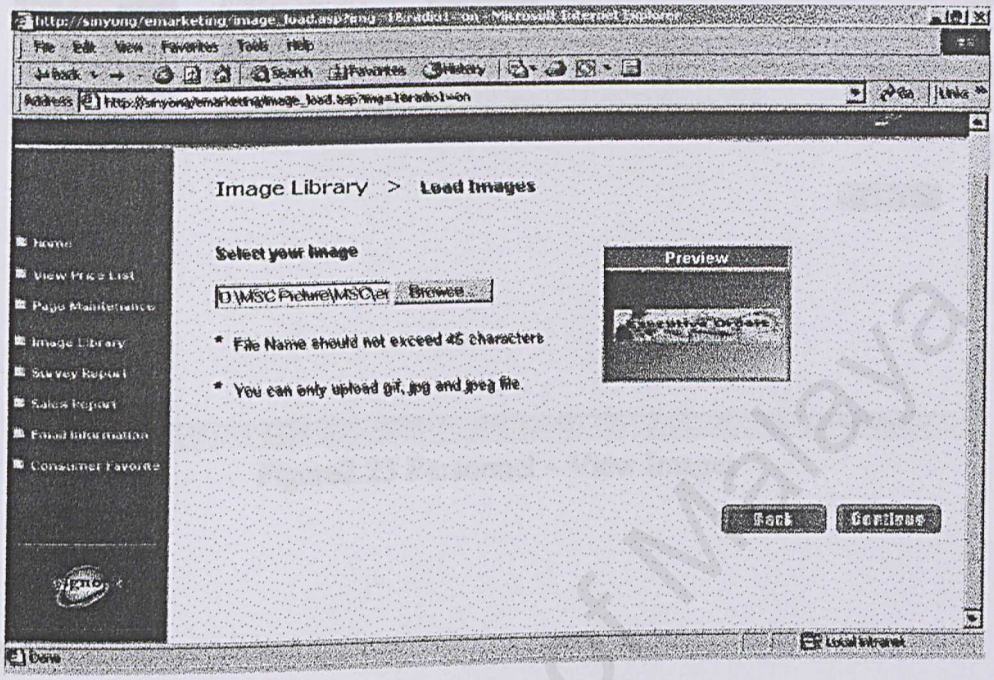

Figure2.21 Personnel – Load Images

2. Click the "Browse" button, to find the image, which you wish to upload.
3. When the path of the image is shown in text box, click the "Continue" button.
4. A confirmation message box will pop-up with "Do you want to upload this image?".

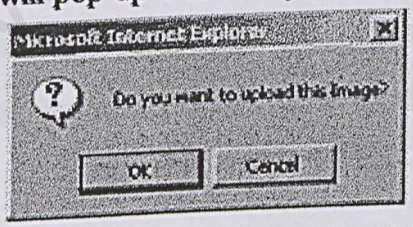

Figure2.22 Personnel – Confirmation To Upload Images

5. Click "OK" button to proceed or click "Cancel" button to abort.
6. After confirm to upload the image, it will link to the page of "Personnel – View Images" show as Figure 2.23.

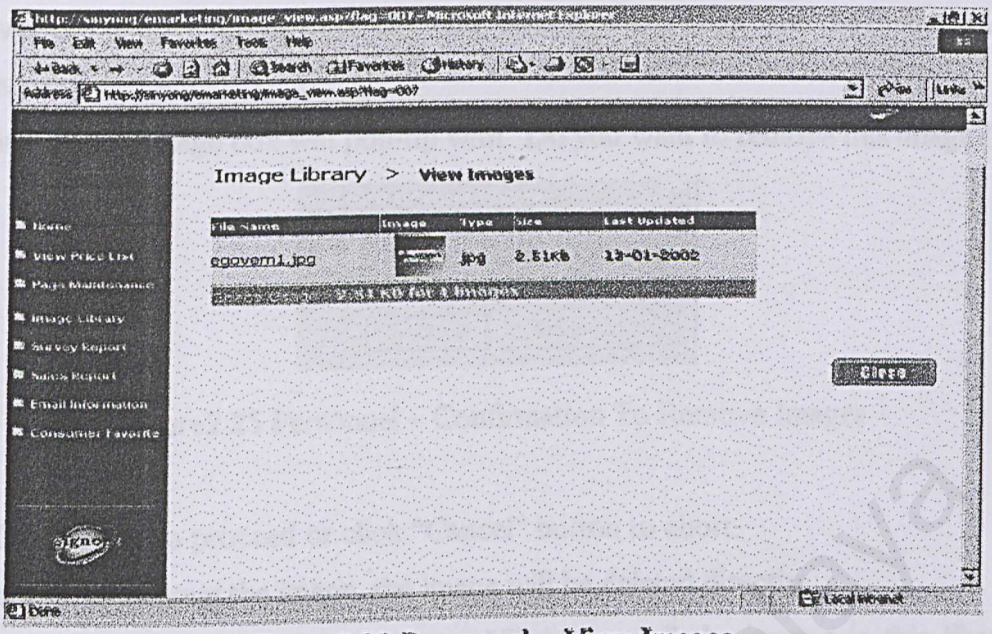

Figure2.23 Personnel – View Images

2.4.2 Remove Images

1. In Figure 2.20, choose the radio button of "Remove Images", then click "Continue" button.

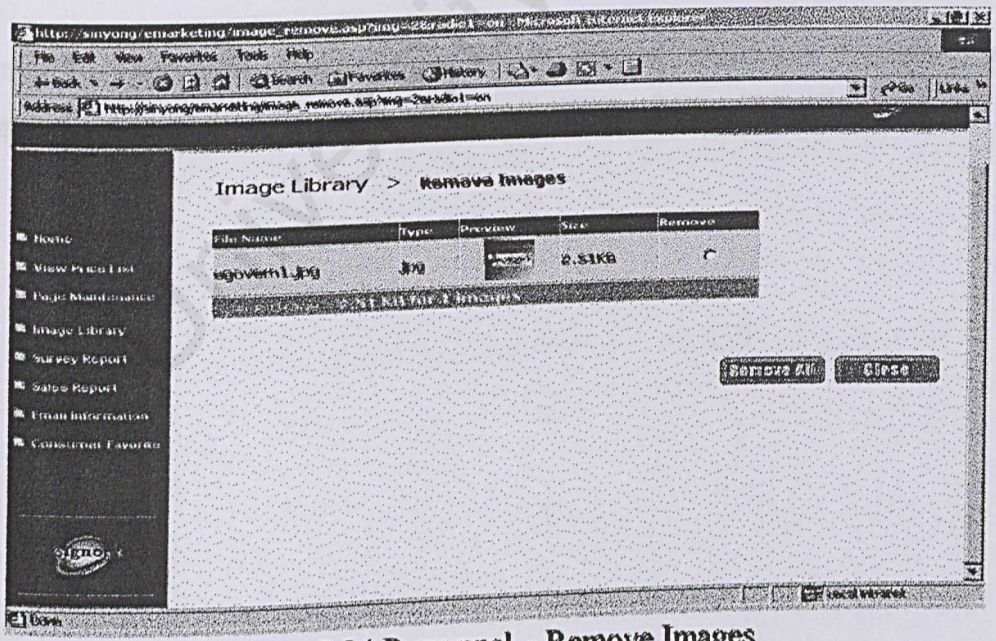

Figure2.24 Personnel – Remove Images

2. If you want to remove image, click the radio button, which align with the image you want to remove.
3. A confirmation message box will pop-up with "Do you want to remove this image?"

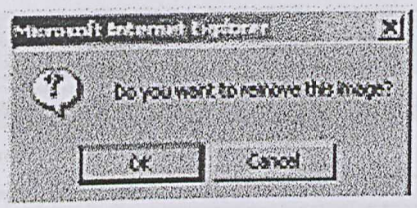

Figure2.25 Personnel – Confirmation To Remove Images

4. Click "OK" button to proceed or click "Cancel" button to abort.
5. After confirm to remove the image, the image will be deleted directly.
6. In Figure 2.24, if you click the "Remove All" button, all the images in this library will be deleted entirely.

2.4.3 View Images

1. In Figure 2.20, choose the radio button of "View Images", then click "Continue" button.
2. The page of "Personnel – View Images" show as Figure 2.23 will be displayed.

2.5 Survey Report

1. When you press **Survey Report** (link), this page will be shown as below

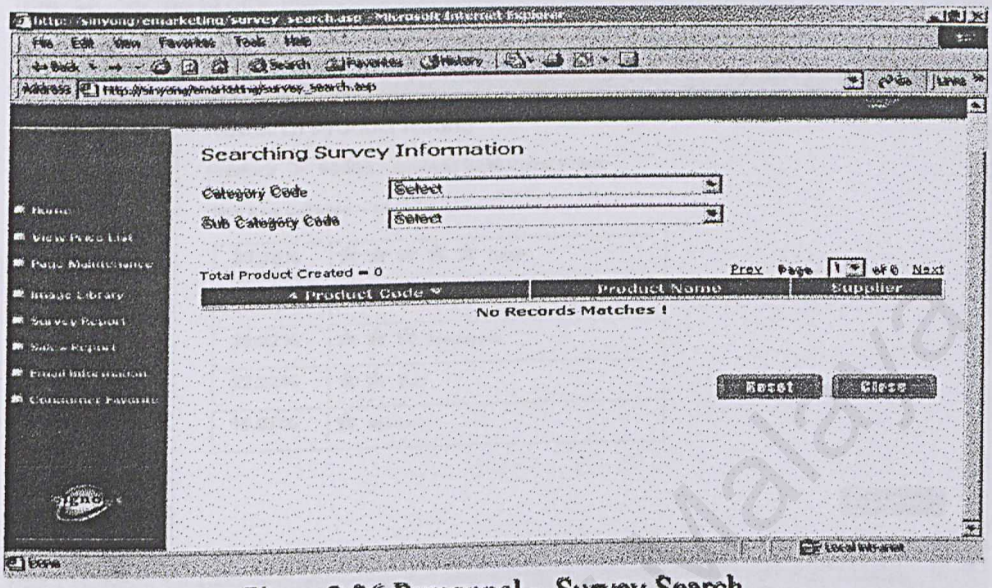

Figure2.26 Personnel – Survey Search

2. Select the Category Code and Sub-Category Code and then the product of this selection will be displayed.

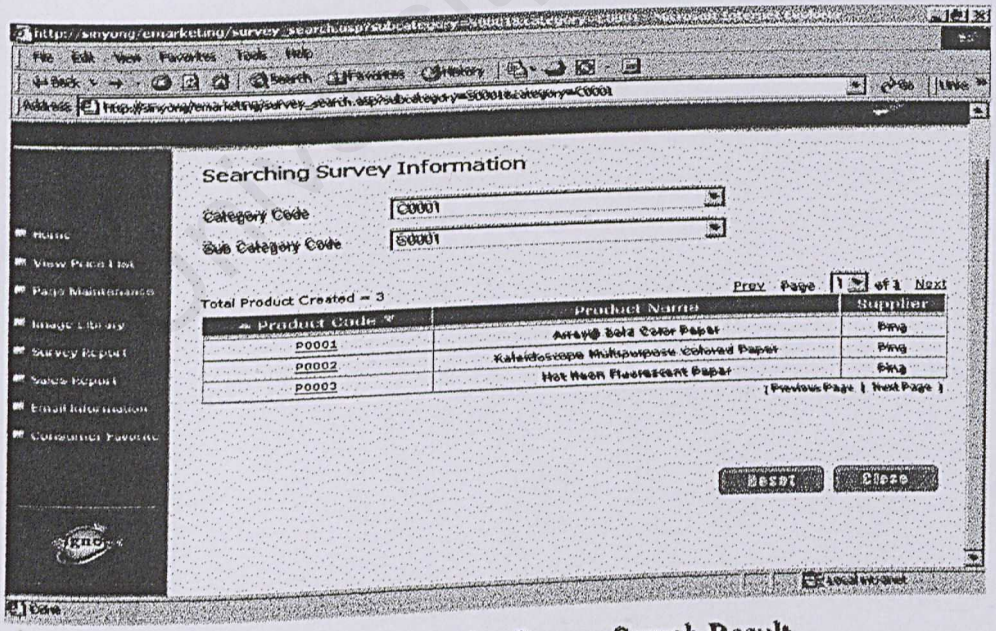

Figure2.27 Personnel – Survey Search Result

3. Choose one of the products to view their popularity by press the link of Product Code.
4. The result of product rating is shown like below.

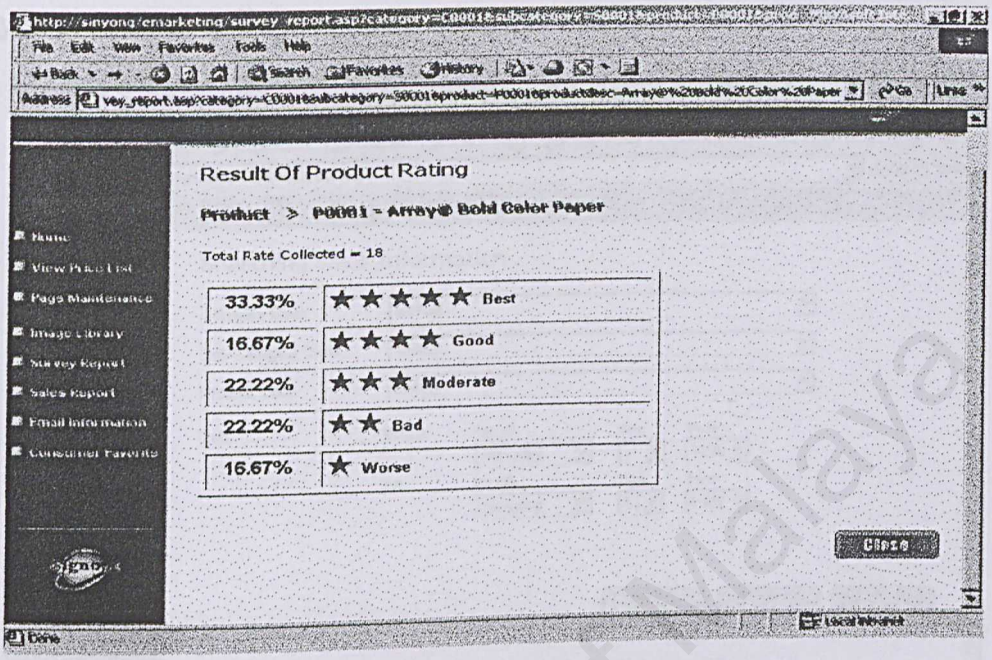

Figure2.28 Personnel – Result Of Product Rating

2.6 Sales Report

1. When you press **Survey Report** (link), this page will be shown as below

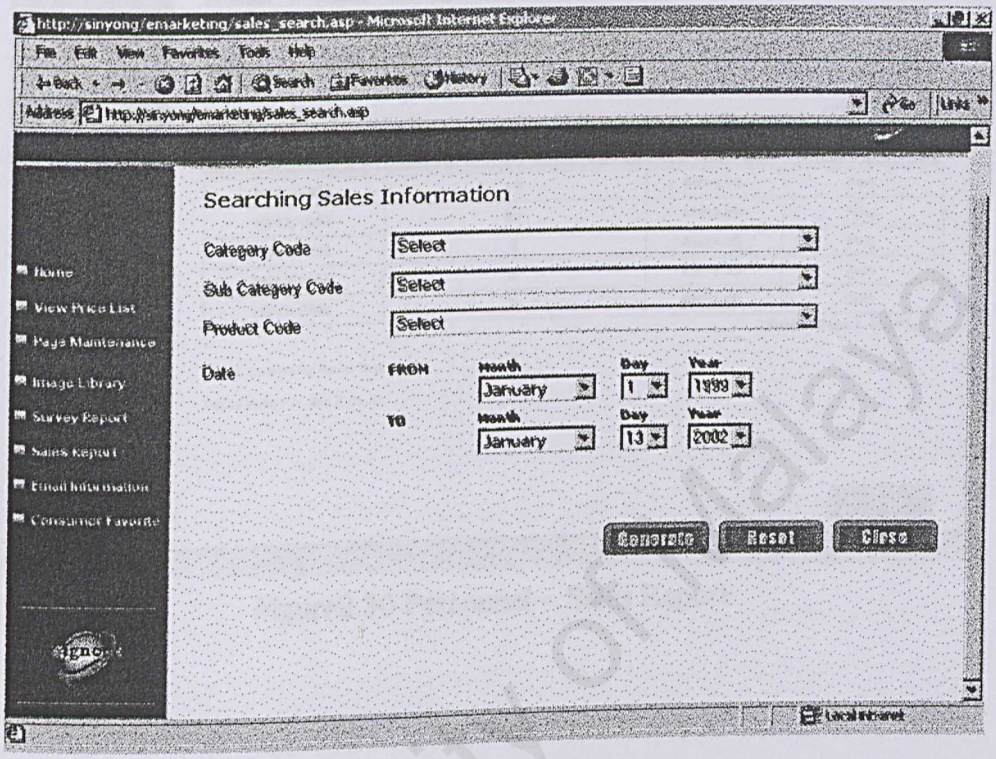

Figure2.29 Personnel – Sales Search

2. Select the Category Code, Sub-Category Code, Product Code and Date then click the "Generate" button to generate the report, which matched with your selection.
3. The sales report is shown like below.

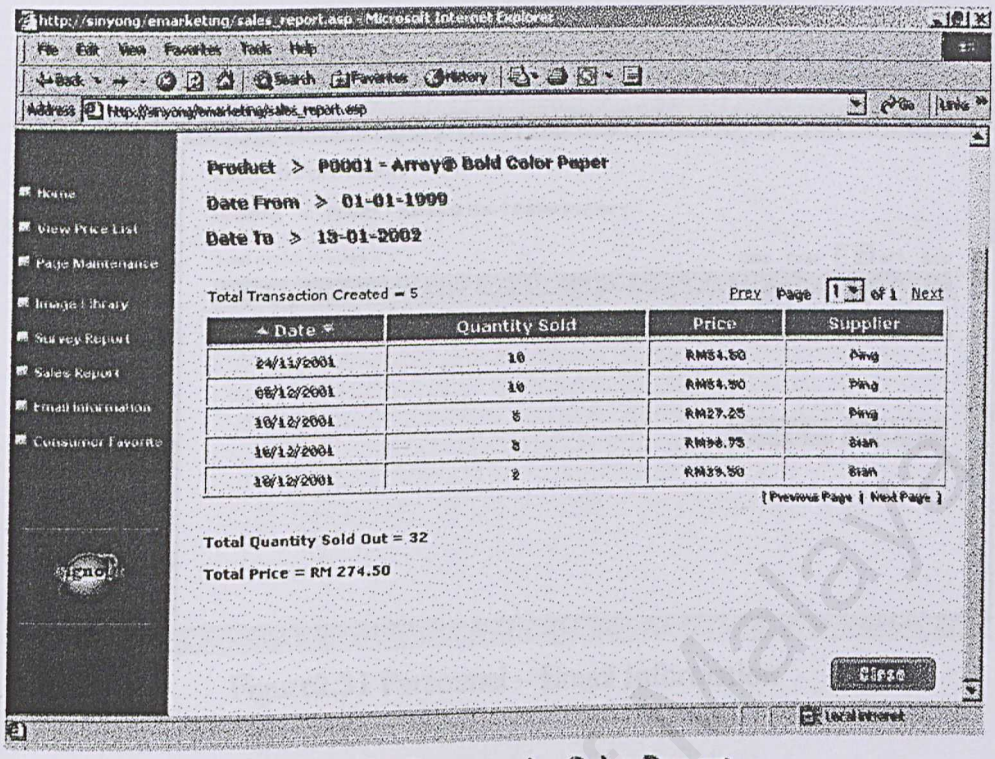

Figure2.30 Personnel – Sales Report

2.7 Email Information

1. When you press **Email Information** (link), this page will be shown as Figure 2.26 but with the title written as "Searching Email Information"
2. Select the Category Code and Sub-Category Code and then the product of this selection will be displayed.
3. Choose one of the products to view that who has chosen this product to recommend to his or her friend by press the link of Product Code.
4. The record of email information is shown like below.

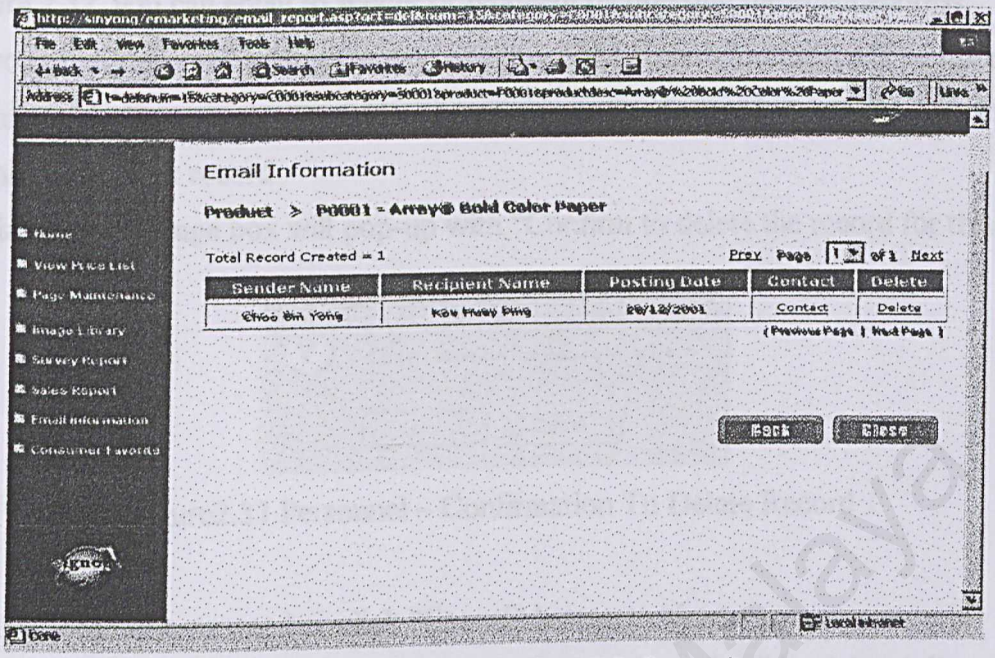

Figure2.31 Personnel – Email Information

5. If you want to contact the sender or recipient, then press the link of "Contact".

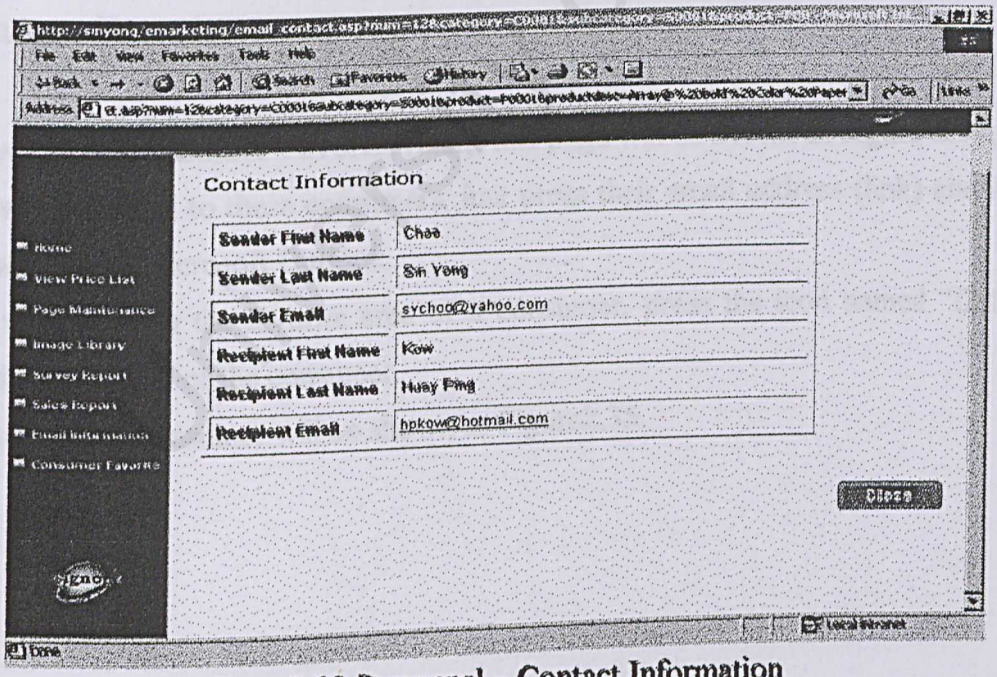

Figure2.32 Personnel – Contact Information

6. In Figure 2.32, you can email to sender or recipient by pressing the email address.
7. Once you press the email address, a new window of Microsoft Outlook will be opened.
8. In Figure 2.31, if you want to delete the certain row of record, press the link of "Delete", which align with that record.
9. A confirmation message box will pop-up with "Confirm to delete the record for this row?"

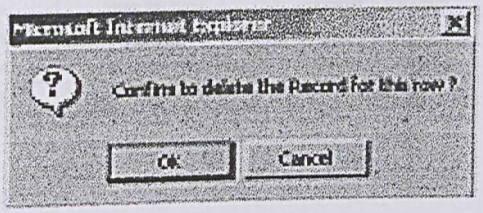

Figure2.33 Personnel – Confirmation To Delete Record

10. Click "OK" button to proceed or click "Cancel" button to abort
11. After confirm to delete the record, the entire row of the record will be deleted directly

2.8 Consumer Favorite

1. When you press **Consumer Favorite** (link), this page will be shown as Figure 2.34.
2. If you want to email to these consumers, just press their email address (link) and it will open a new window of Microsoft Outlook.
3. If you want to view the favorite area of a consumer, press the icon named "Detail" which align with the record of the consumer.
4. The details of the consumer will be shown as Figure2.35.

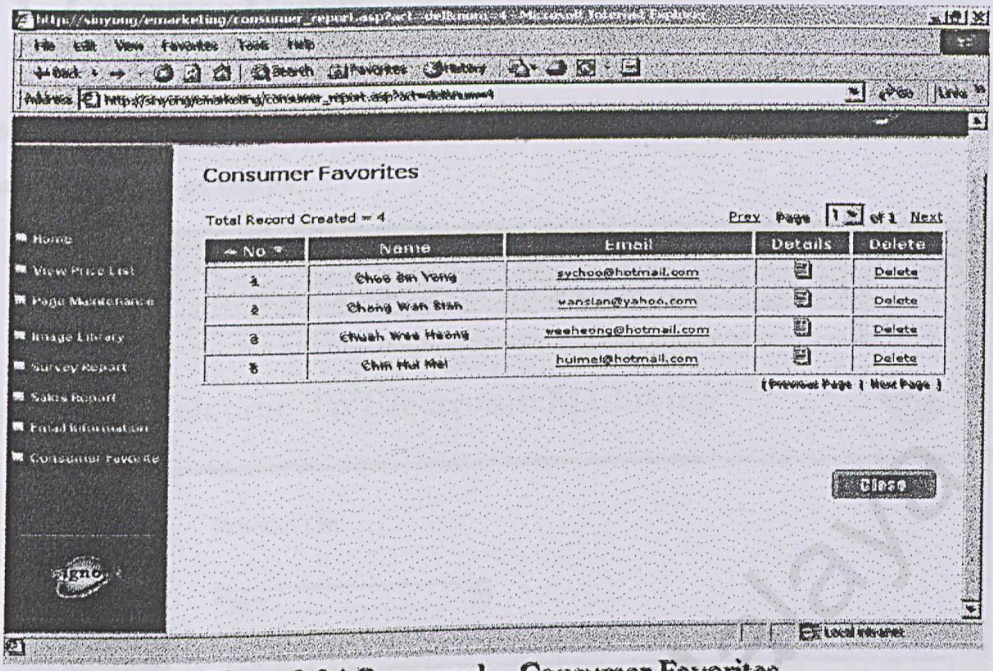

Figure2.34 Personnel – Consumer Favorites

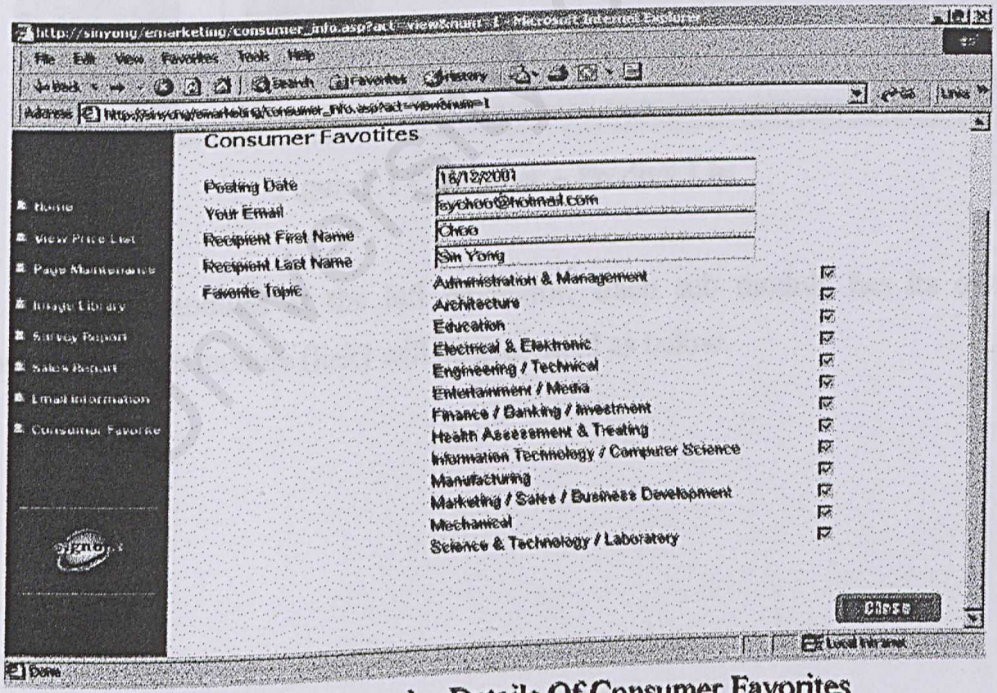

Figure2.35 Personnel -- Details Of Consumer Favorites

Chapter 3 Consumer Module

When a user enters this system as Consumer, he or she will be brought into Consumer Module. The page will be shown as below.

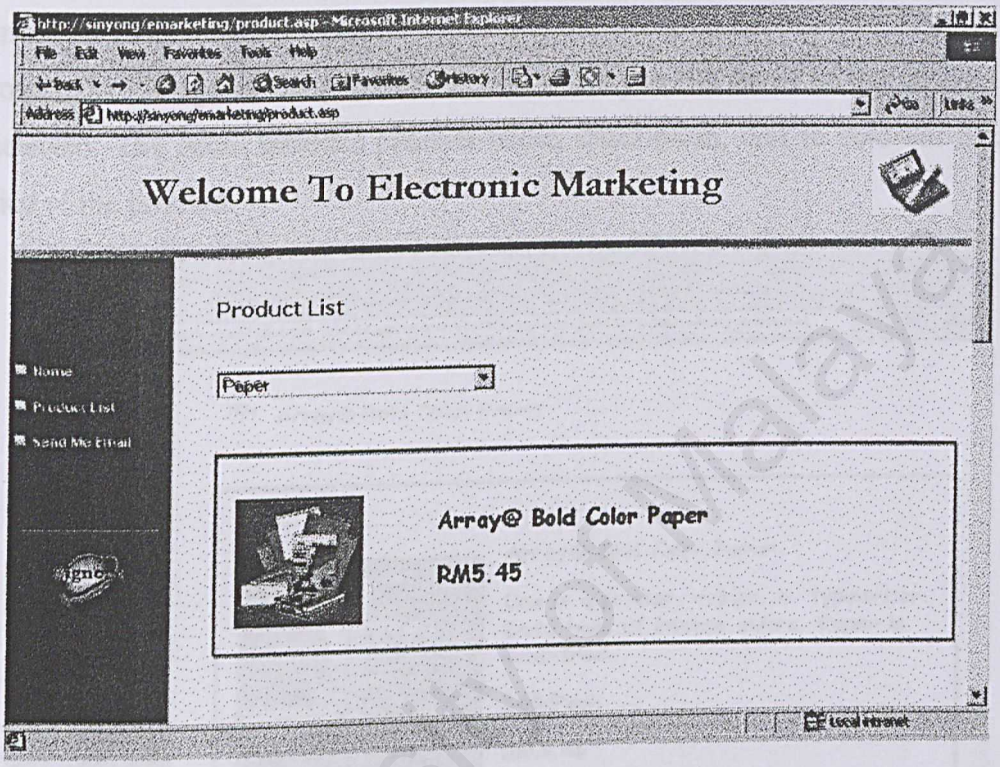

Figure3.1 Consumer – Product List

There are three sub modules at the left navigator. Each sub module has its own function. Explanation for each sub module (link) will be presented as below.

3.1 Home

1. When you press **Home** (link), the catalog of the promotion products will be shown as Figure 3.1.
2. Each image of the product is a link.
3. Press one of the image of the products, it will show you the detail of the product which you have selected. The detail includes product name, description, unit to sold out once purchase and price of the product.

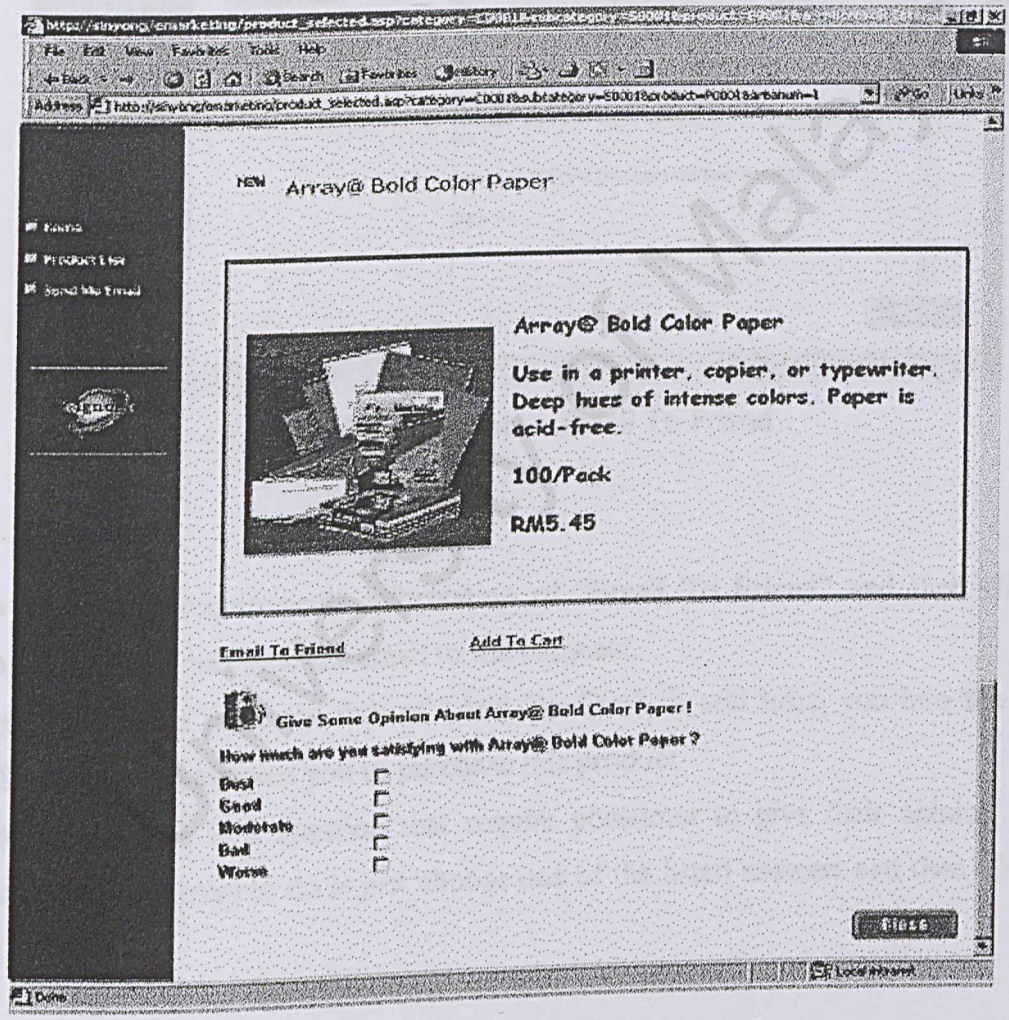

Figure3.2 Consumer – Product Selected

4. In Figure3.2, if you press the link of "Email To Friend", you can recommend this product to your friend through the email feature, which has been provided by this system.

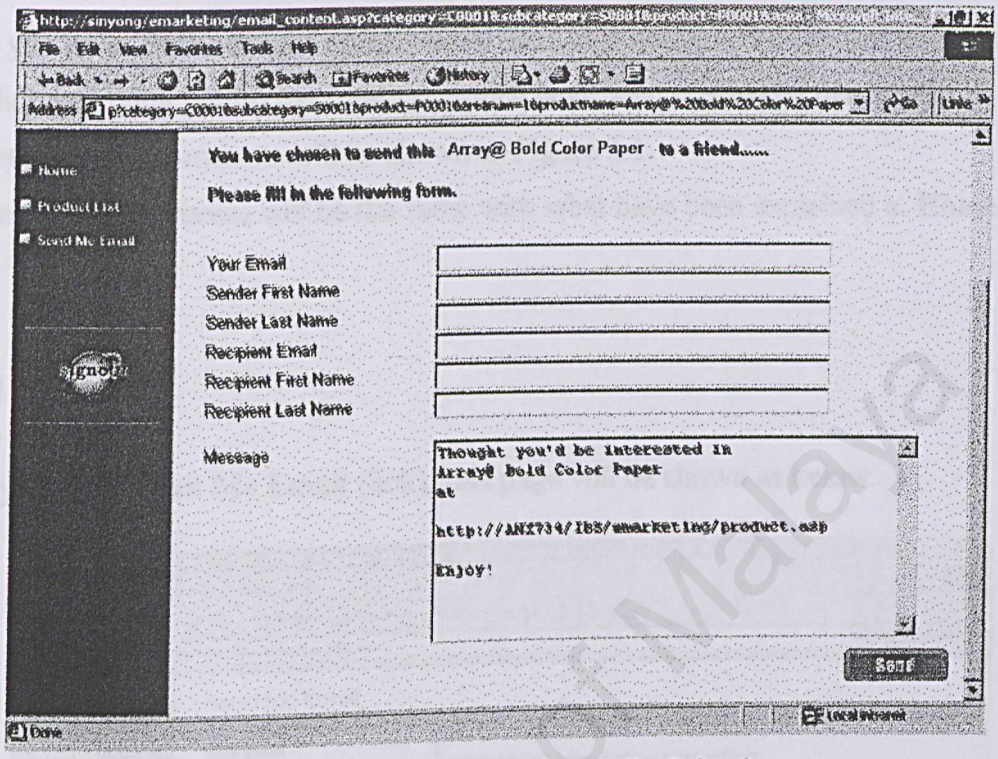

Figure3.3 Consumer – Email To Friend

5. Fill in the all the requirements information of "Email To Friend" and then click "Send" button. This system will send the email to the recipient.
6. In Figure3.2, if you press the link of "Add To Cart", it will bring you into the Electronic Sales System, which allowed you to purchase this product.
7. In Figure 3.2, there is a question that require consumer to give their opinion about that product. What you have to do is just choose one of the listed answers and then click "Close" button.

3.2 Product List

1. When you press **Product List** (link), all the links of product will be shown as Figure 2.1.
2. Each link will bring you to the catalogs, which have been created by personnel.
3. The catalog of the products will be shown as Figure 3.1.
4. So, the following process will be the same with what have been explained in **Home** (link).

3.3 Send Me Email

1. When you press **Send Me Email** (link), this page will be shown as below.

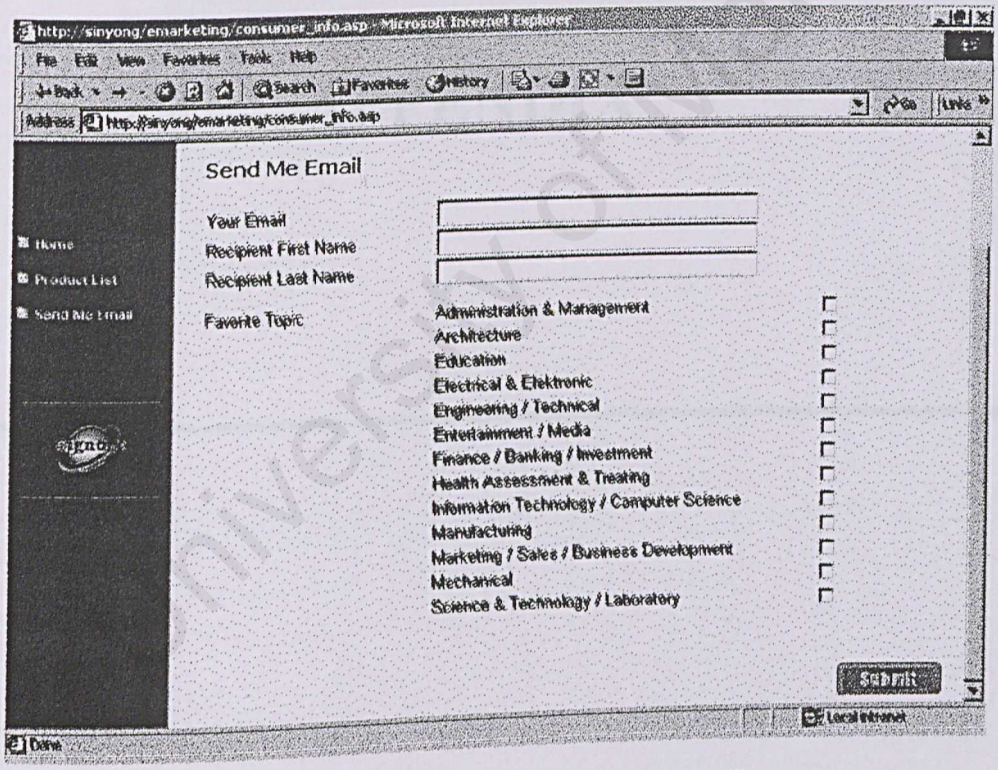

Figure3.4 Consumer – Send Me Email

2. Fill in all the requirements information of "Send Me Email" and then click "Submit" button.
3. It will bring you back to the page of "Consumer – Product List" show as Figure 3.1.

APPENDIX

Appendix

1. Sample Coding Of Functions In Component Object Model (COM)

1.1 Function Add Record

Example taken from the project with function name as "Add_Record"

```
'*************************************************************************'
Public Function Add_Record(lconstr As Variant, lFields As Variant, lFieldValues As Variant, _
                           lTable As Variant) As Variant
Dim cn As ADODB.Connection
On Error GoTo ErrHandler

  Set cn = New ADODB.Connection
  cn.Open lconstr
  cn.CursorLocation = adUseClient
  cn.BeginTrans
  If lFields = "" Then
    strsql = "set dateformat dmy; Insert into " & lTable & " values (" & lFieldValues & ")"
  Else
    strsql = "set dateformat dmy; Insert into " & lTable & " (" & lFields & ") values
             (" & lFieldValues & ")"
  End If

  cn.Execute strsql
  cn.CommitTrans
  Add_Record = True
  Exit Function
```

```
ErrHandler:
   cn.RollbackTrans
   Add_Record = "False | " & Err.Description
End Function
'*************************************************************************************
```

1.2 Function Delete Record

Example taken from the project with function name as "Del_Record"

```
'*************************************************************************************
Public Function Del_Record(lconstr As Variant, lTable As Variant, _
          lWhere As Variant) As Variant
Dim cn As ADODB.Connection
On Error GoTo ErrHandler

  Set cn = New ADODB.Connection
  cn.Open lconstr
  cn.CursorLocation = adUseClient
  cn.BeginTrans
  If lWhere <> "" Then
     strsql = "delete from " & lTable & " where " & lWhere
  Else
     strsql = "delete from " & lTable
  End If

  cn.Execute strsql
  cn.CommitTrans
  Del_Record = True
  Exit Function
```

```
ErrHandler:
  Del_Record = False
End Function
'*************************************************************************************'
```

1.3 Function Select Record

Example taken from the project with function name as "Del_Record"

```
'*************************************************************************************'
Public Function Sel_Record(lconstr As Variant, lFields As Variant, lTable As Variant, lWhere
                           As Variant, lOrder As Variant, lGroup As Variant, ByVal selrs As
                           ADODB.Recordset) As Variant
On Error GoTo ErrHandler

 If selrs Is Nothing Then
    Set selrs = New ADODB.Recordset
 End If

 strsql = "select " & lFields & " from " & lTable
 If lWhere <> "" Then
    strsql = strsql & " where " & lWhere
 End If
 If lOrder <> "" Then
    strsql = strsql & " order by " & lOrder
 End If
 If lGroup <> "" Then
    strsql = strsql & " group by " & lGroup
 End If
```

```
    With selrs
      .ActiveConnection = lconstr
      .CursorLocation = adUseClient
      .CursorType = adOpenForwardOnly
      .Source = strsql
      .Open
    End With

    Sel_Record = selrs.GetRows()
    Exit Function

ErrHandler:
    Sel_Record = "Error | " & Err.Description
End Function
'*************************************************************************'
```

1.4 Function Update Record

Example taken from the project with function name as "Del_Record"

```
'*************************************************************************'
Public Function Upd_Record(lconstr As Variant, lFields As Variant, lFieldValues As Variant,
                           lTable As Variant, lWhere As Variant) As Variant
Dim cn As ADODB.Connection
Dim arrField, arrValue
Dim iMax, iCtr As Integer
On Error GoTo ErrHandler

  arrField = Split(lFields, "|")
  arrValue = Split(lFieldValues, "|")
```

```
If UBound(arrField) <> UBound(arrValue) Then
  Upd_Record = False
  Exit Function
End If

strsql = "set dateformat dmy; update " & lTable & " set "
iMax = UBound(arrField)
For iCtr = 0 To iMax
  If iCtr > 0 Then
    strsql = strsql & ","
  End If
  strsql = strsql & arrField(iCtr) & "=" & arrValue(iCtr)
Next

If lWhere <> "" Then
  strsql = strsql & " where " & lWhere
End If

Set cn = New ADODB.Connection
cn.Open lconstr
cn.CursorLocation = adUseClient
cn.BeginTrans

cn.Execute strsql
cn.CommitTrans
Upd_Record = True
Exit Function
```

```
ErrHandler:
   Upd_Record = False
End Function
'*************************************************************************'
```

2. Sample Coding Of Database Connection In Active Server Page (ASP)

Every ASP page, which needs to connect with database, has to include a file that contains a connection string.

Example taken from the project with file name as "condata.asp"

```
'*************************************************************************'
constr = "provider=sqloledb; data source=sinyong; initial catalog=emarketing; user id=sa;
          password=;"
'*************************************************************************'
```

2.1 Adding Record Into Database

Example taken from the project with file name as "emailproc.asp"
The program flow diagram for this coding is show as Figure 1 in Appendix.

```
'*************************************************************************'
set obj=server.CreateObject("dbaccess.emarketing")

lvalue = "" &num& "'," &category& "'," &subcategory& "'," &product& "',
         '" &productname& "'," &sender& "'," &senfirstname& "'," &senlastname& "',
         '" &recipient& "'," &firstname& "'," &lastname& "','"&senddate&""
```

```
lfield = " Number,Category_Code,SubCategy_Code,Product_Code,Product_Name,Sen_Email,
        Sen_First_Name,Sen_Last_Name,Rep_Email,Rep_First_Name,Rep_Last_Name,Date "

rs1 = obj.Add_Record(constr, lfield, lvalue, "ConsumerInfo")
'*************************************************************************'
```

2.2 Delete Record From Database

Example taken from the project with file name as "product_category.asp"
The program flow diagram for this coding is show as Figure 2 in Appendix.

```
'*************************************************************************'
set obj=server.CreateObject("dbaccess.emarketing")
lwhere = " Category_Code = '" & code & "' "
rs4 = obj.Del_Record(constr, "MainBody", lwhere)
'*************************************************************************'
```

2.3 Select Record From Database

Example taken from the project with file name as "consumer_info.asp"
The program flow diagram for this coding is show as Figure 3 in Appendix.

```
'*************************************************************************'
set obj = server.CreateObject("dbaccess.emarketing")
set adors = server.CreateObject("adodb.recordset")
lwhere = " Number = '" &num& "' "
rs= obj.Sel_Record(constr, "*", "ConsumerFavorites", lwhere, "", "", adors)
```

```
if isarray(rs) then
        email = rs(1,0)
        firstname = rs(2,0)
        lastname = rs(3,0)
        administration = rs(4,0)
        architecture = rs(5,0)
        education = rs(6,0)
        electrical = rs(7,0)
        engineering = rs(8,0)
        entertainment = rs(9,0)
        finanace = rs(10,0)
        health = rs(11,0)
        computer = rs(12,0)
        manufacturing = rs(13,0)
        marketing = rs(14,0)
        mechanical = rs(15,0)
        science = rs(16,0)
        date1 = rs(17,0)
end if
'*************************************************************************'
```

2.4 Update Record Into Database

Example taken from the project with file name as "edit_subcategory.asp"

The program flow diagram for this coding is show as Figure 4 in Appendix.

```
'*************************************************************************
set obj = server.CreateObject("dbaccess.emarketing")
lvalue = " '" &subcategorydesc& "' "
lfield = " SubCategy_Desc "
lwhere = " Category_Code = '" & category & "' and SubCategy_Code = '" & subcategory & "'"
rs2 = obj.Upd_Record(constr,lfield,lvalue,"NewSubCategory",lwhere)
'*************************************************************************
```

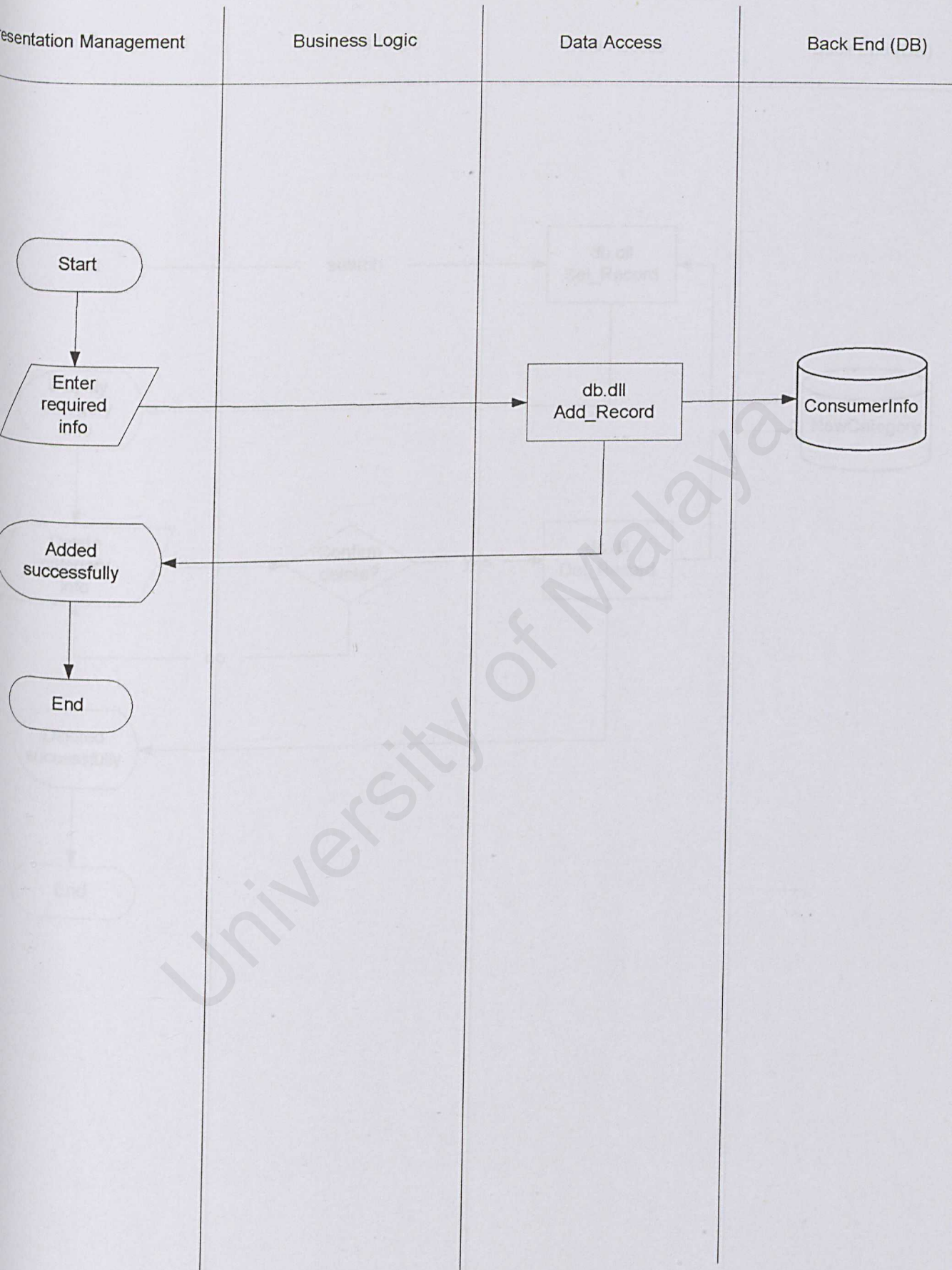

Figure 1 Adding Record Into Database

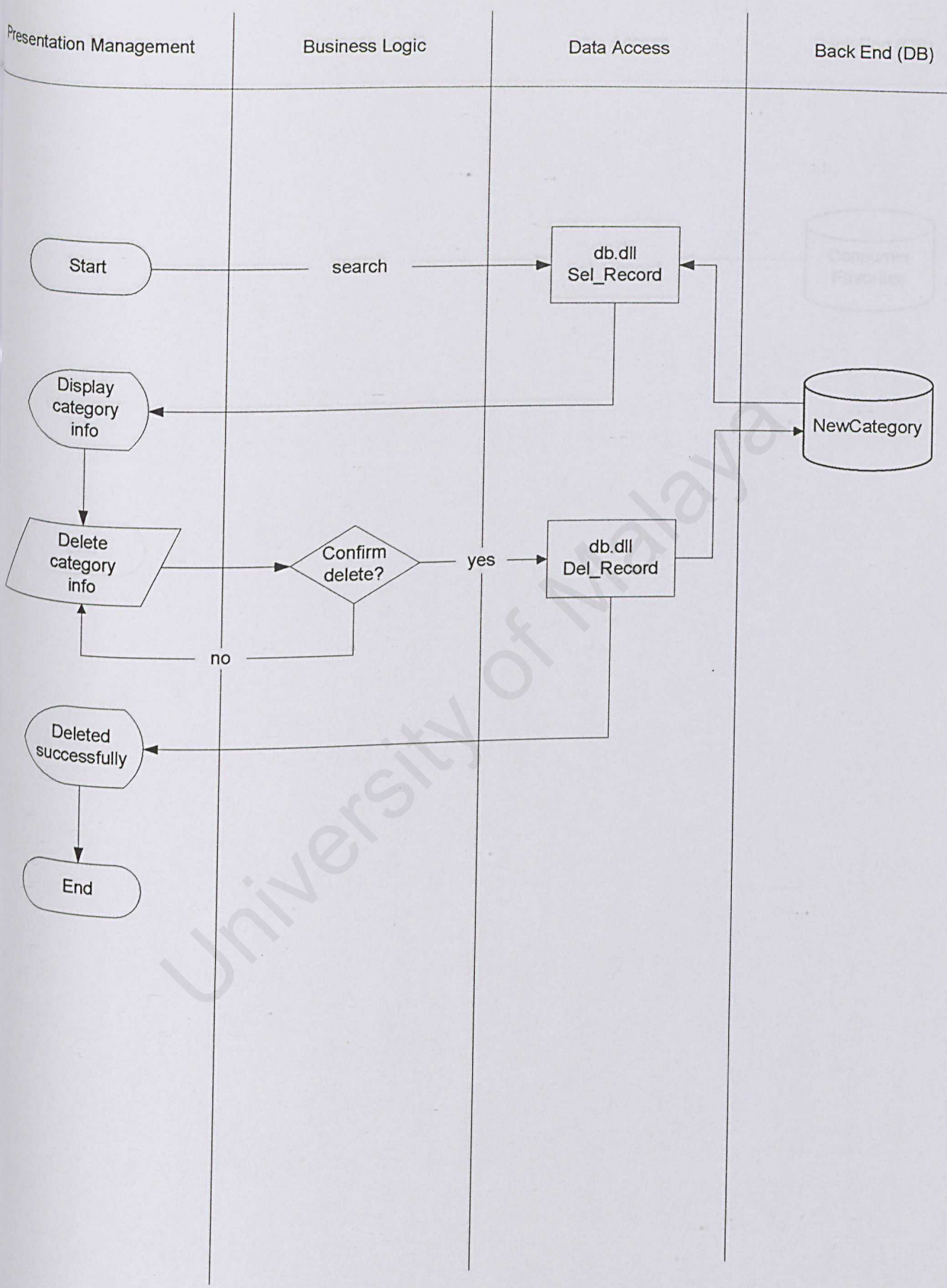

Figure 2 Delete Record From Database

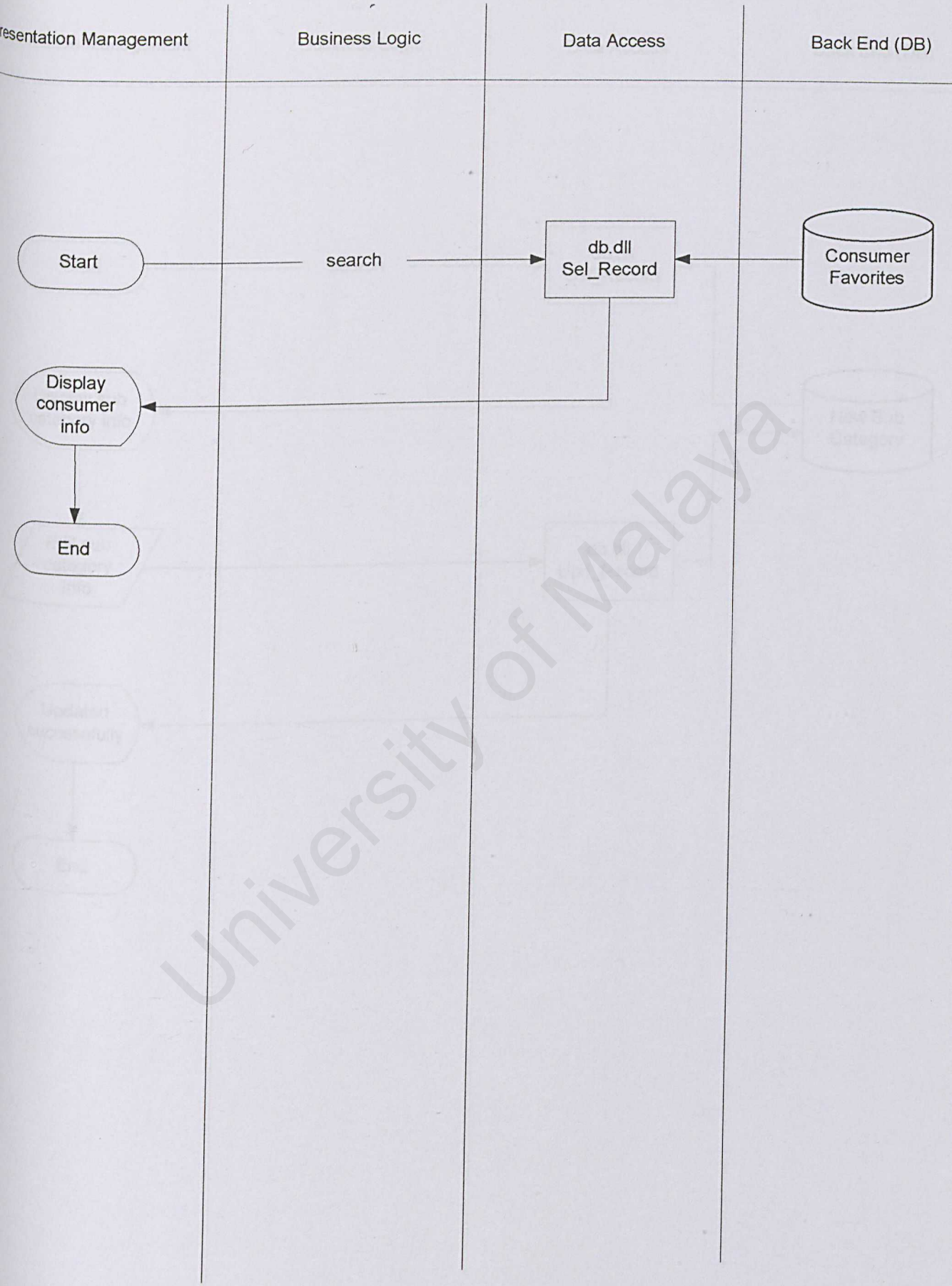

Figure 3 Select Record From Database

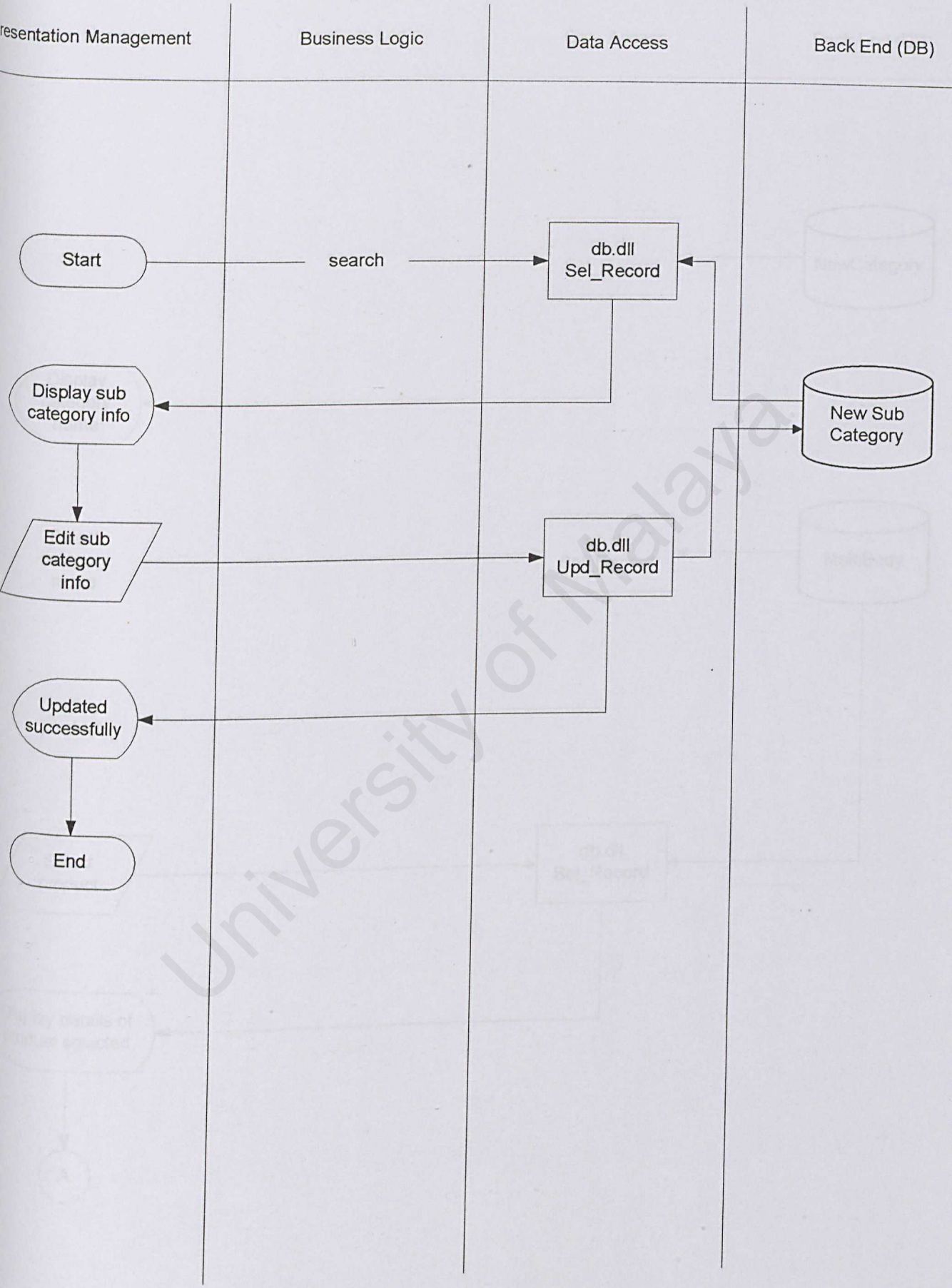

Figure 4 Update Record Into Database

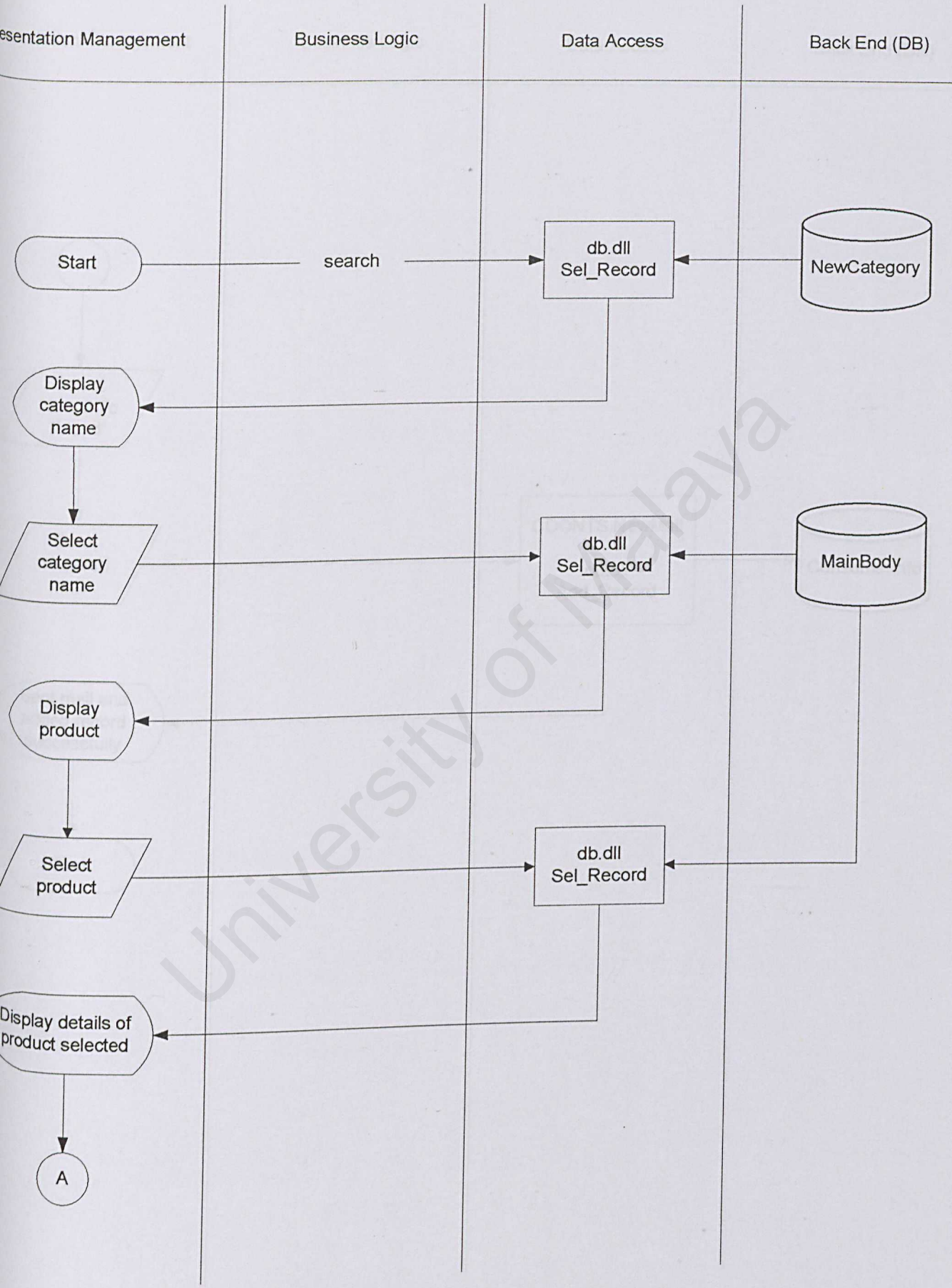

Figure 5 Product List

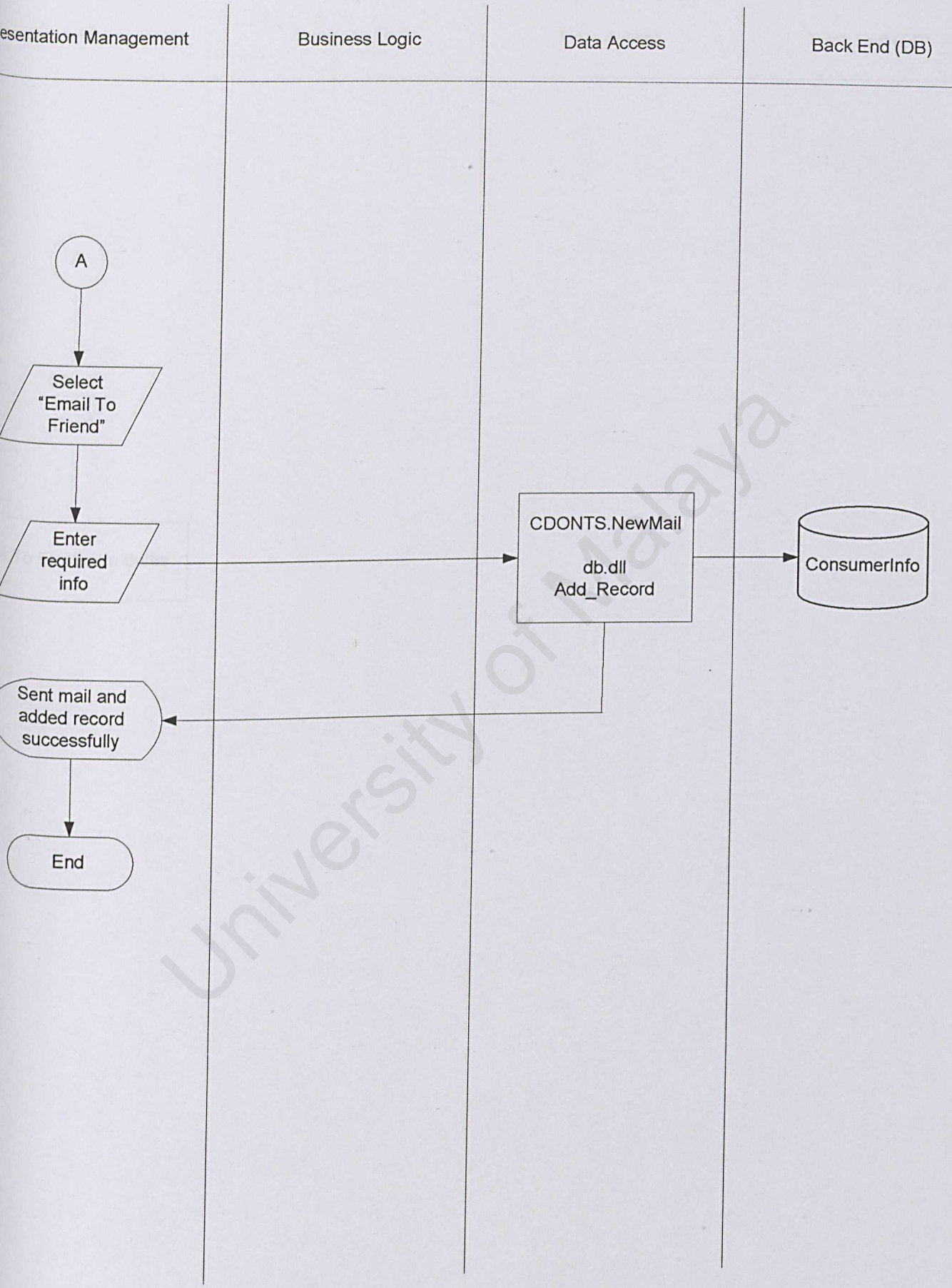

Figure 6 Email To Friend

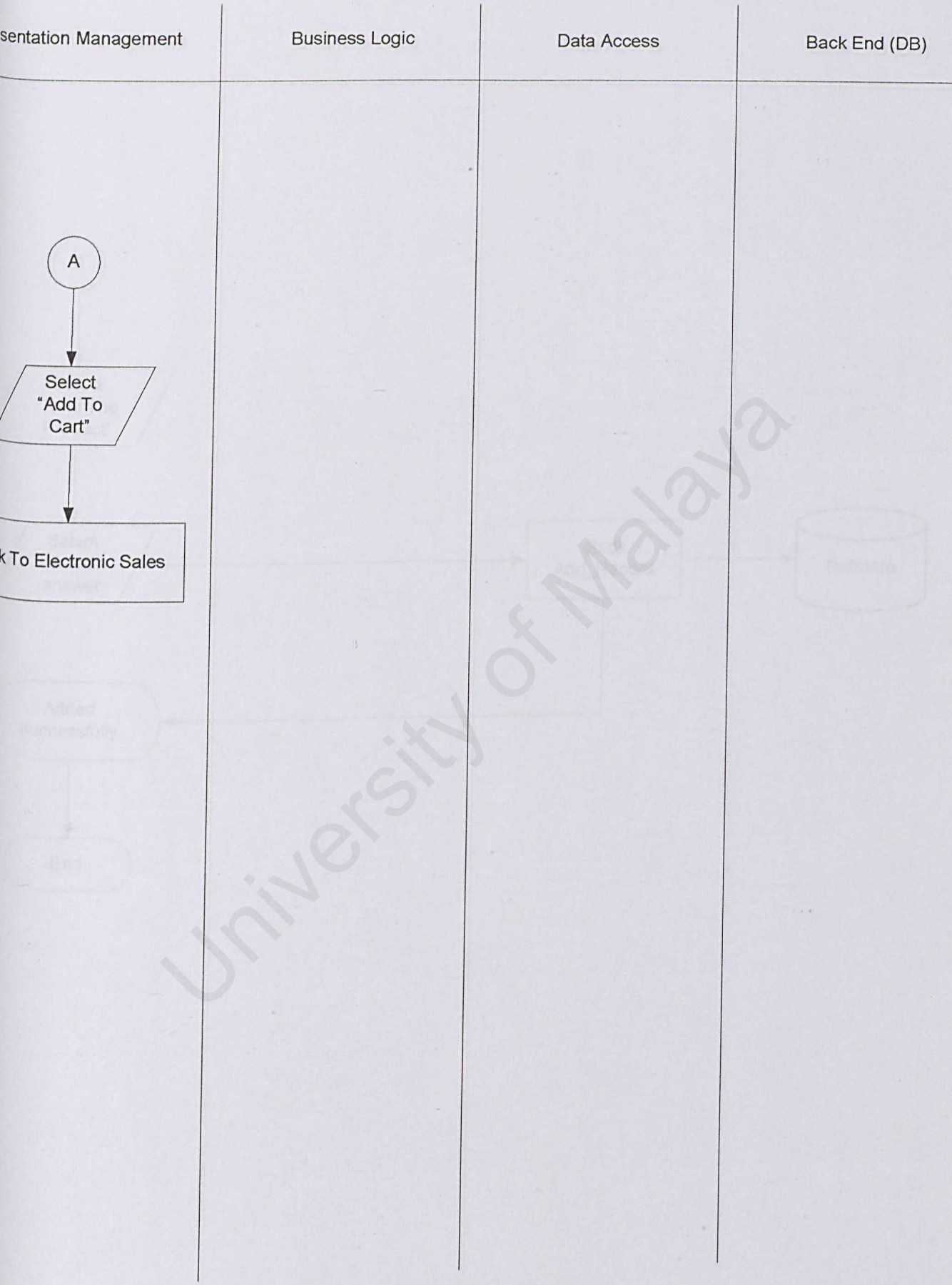

Figure 7 Add To Cart

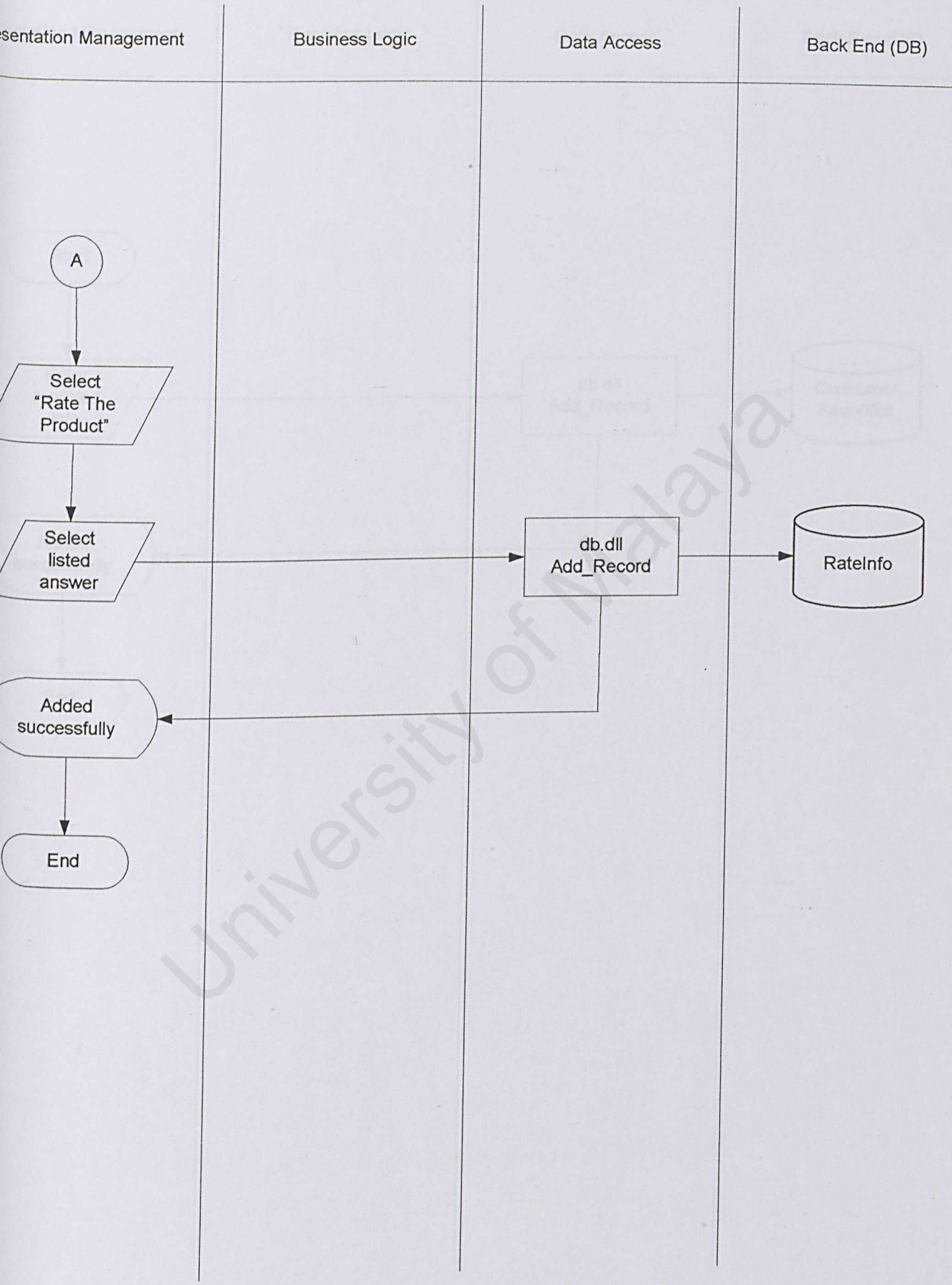

Figure 8 Rate The Info

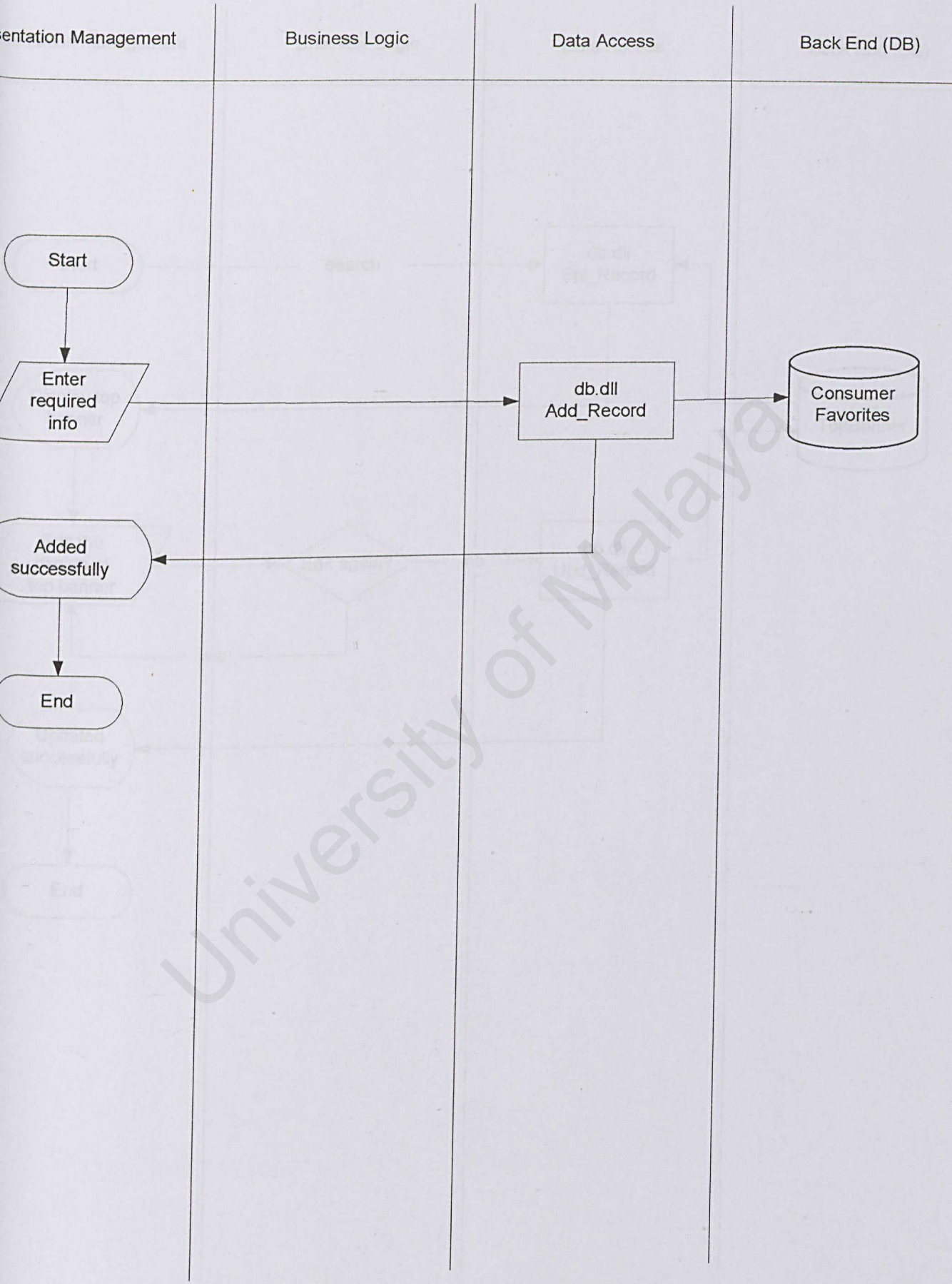

Figure 9 Send Me Email

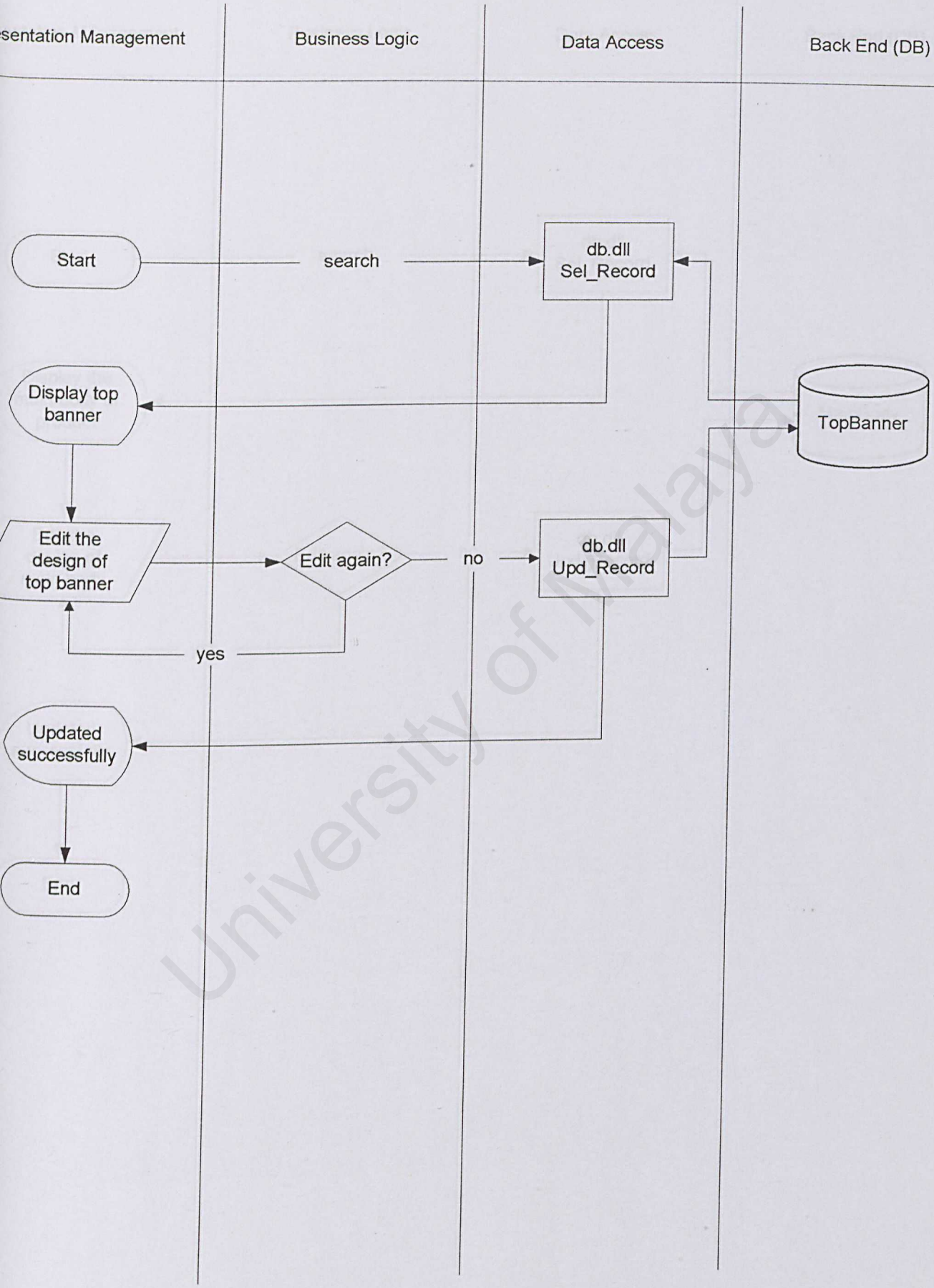

Figure10 Page Maintenance - Top Banner

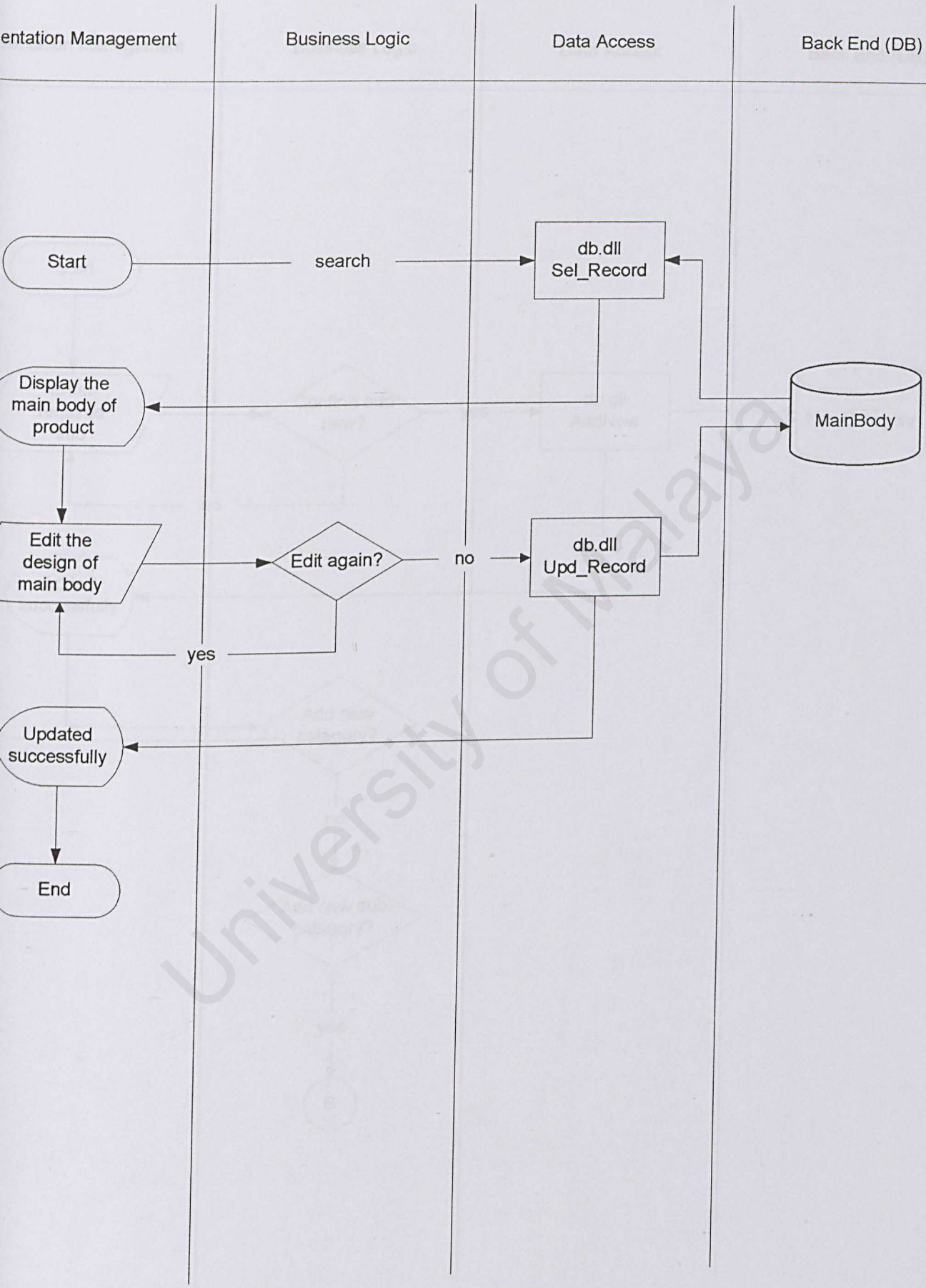

Figure11 Page Maintenance - Main Body

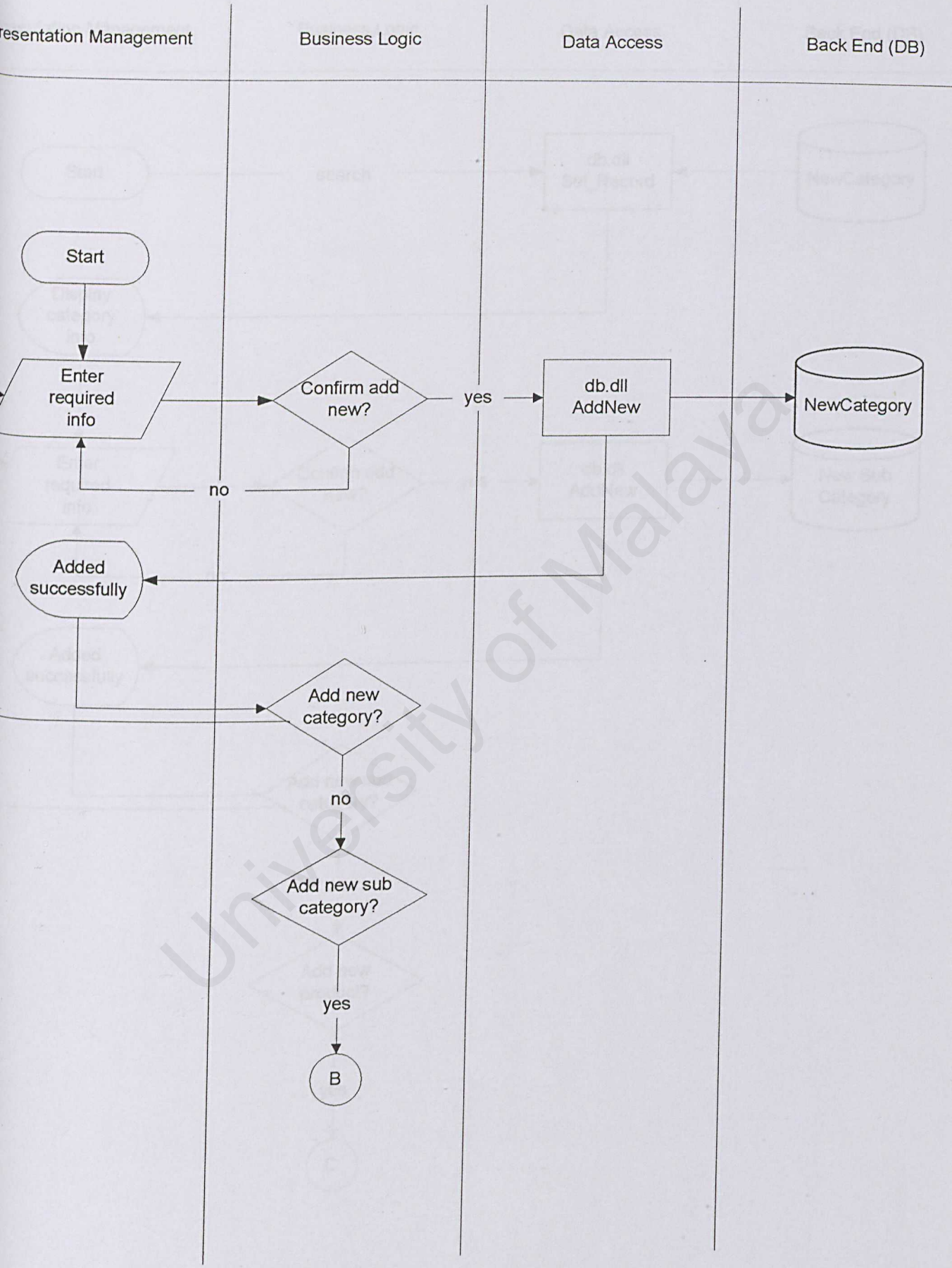

Figure 12 Add New Category

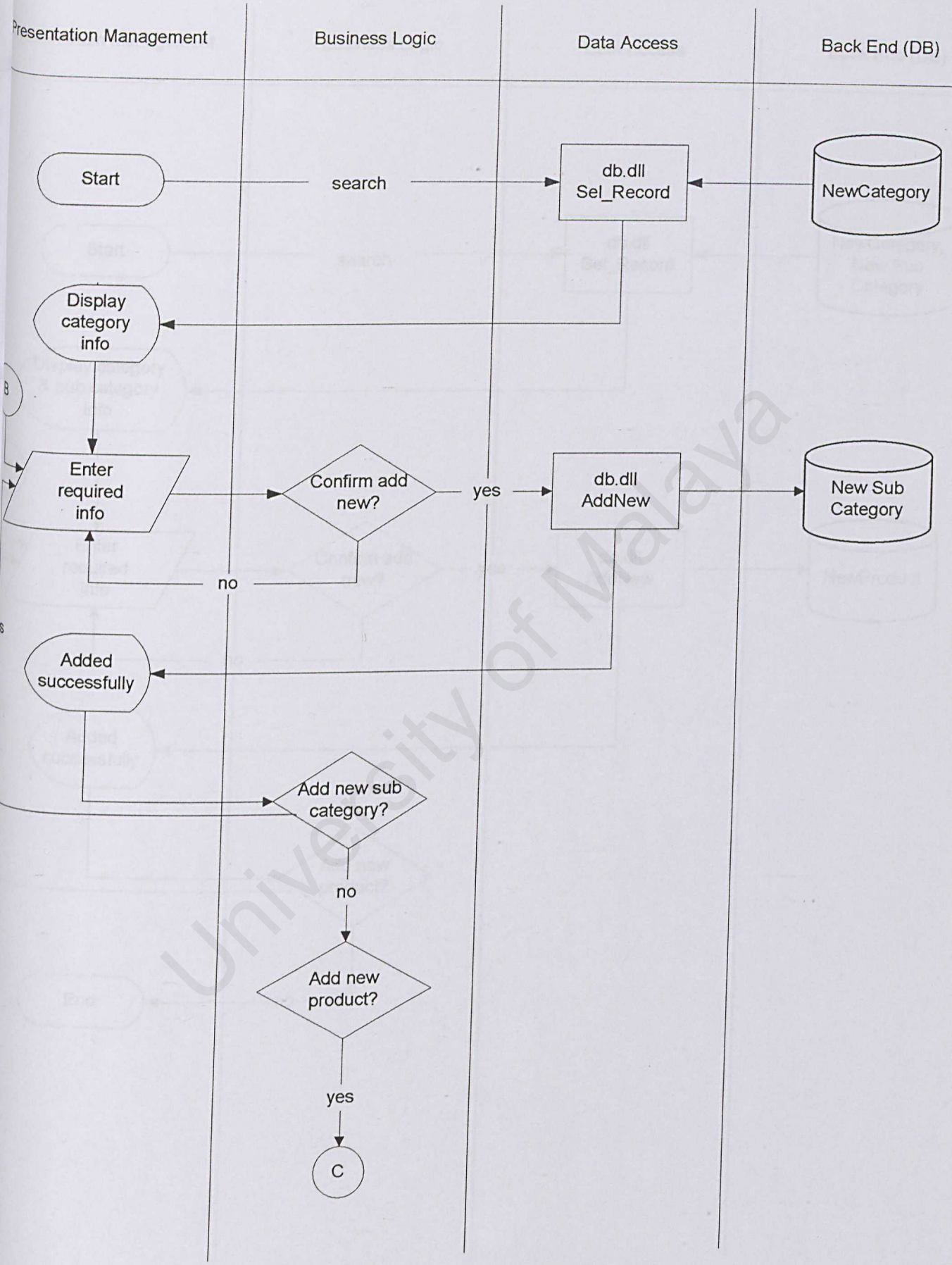

Figure 13 Add New Sub Category

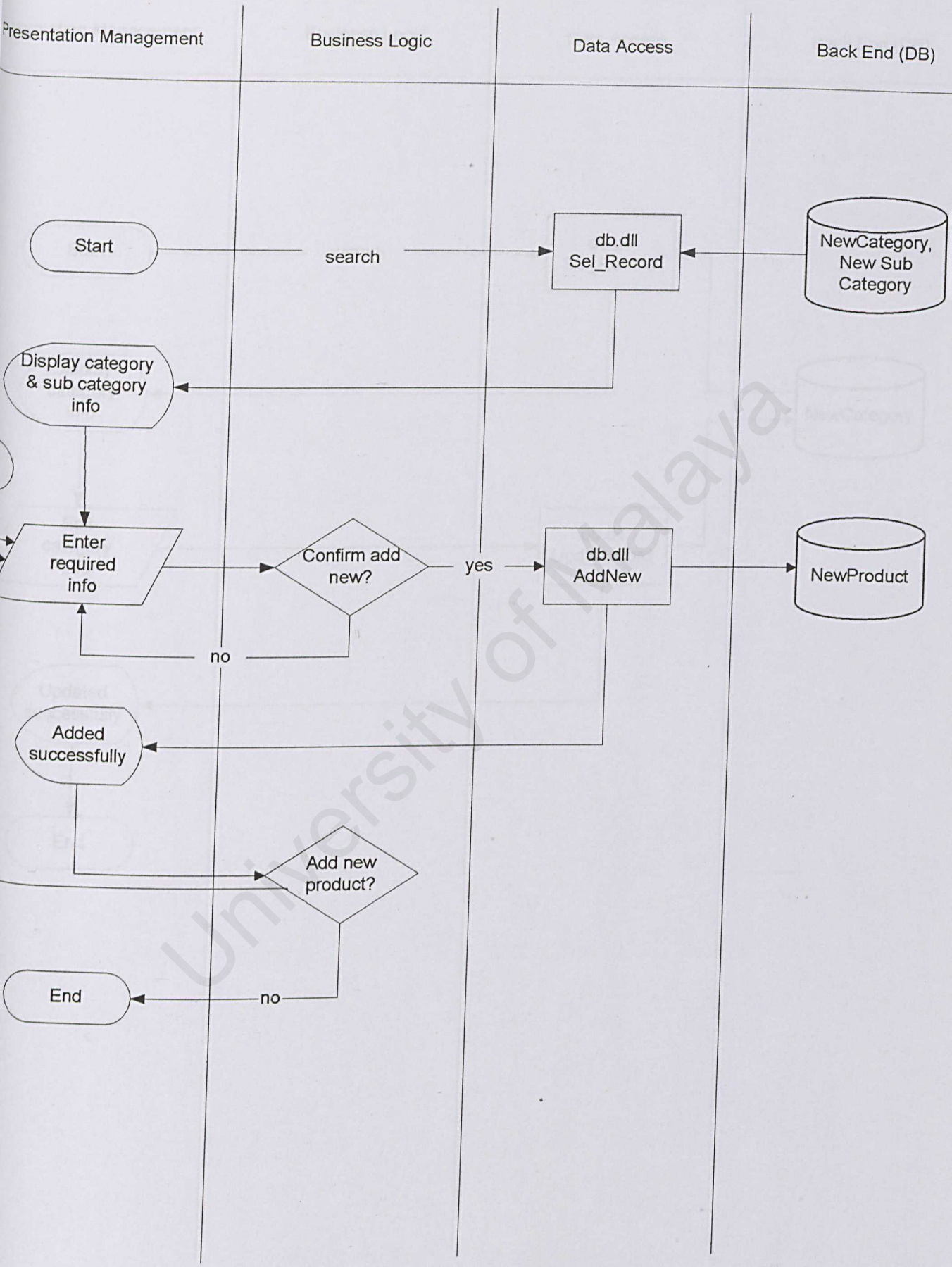

Figure 14 Add New Product

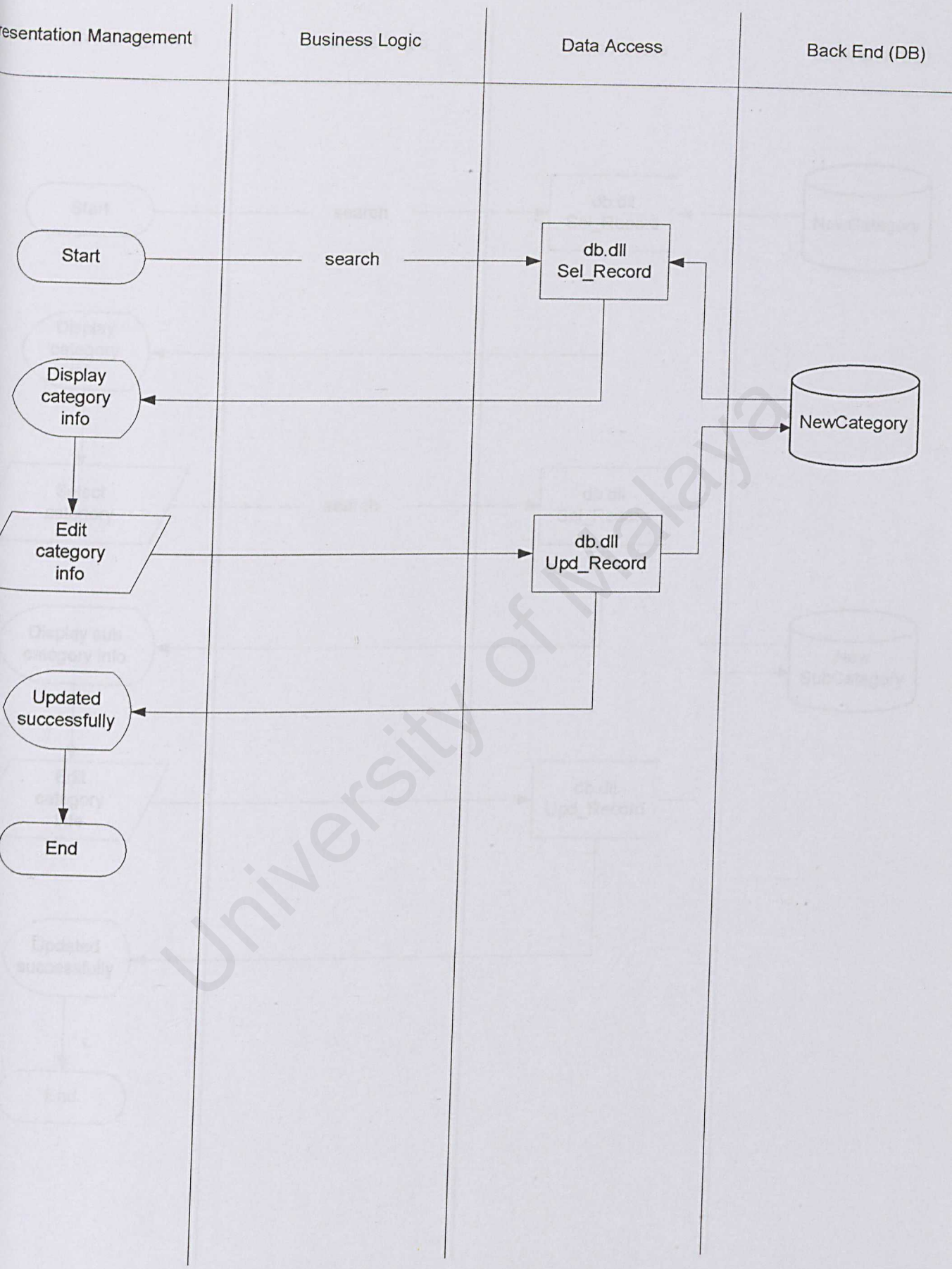

Figure 15 Edit Category

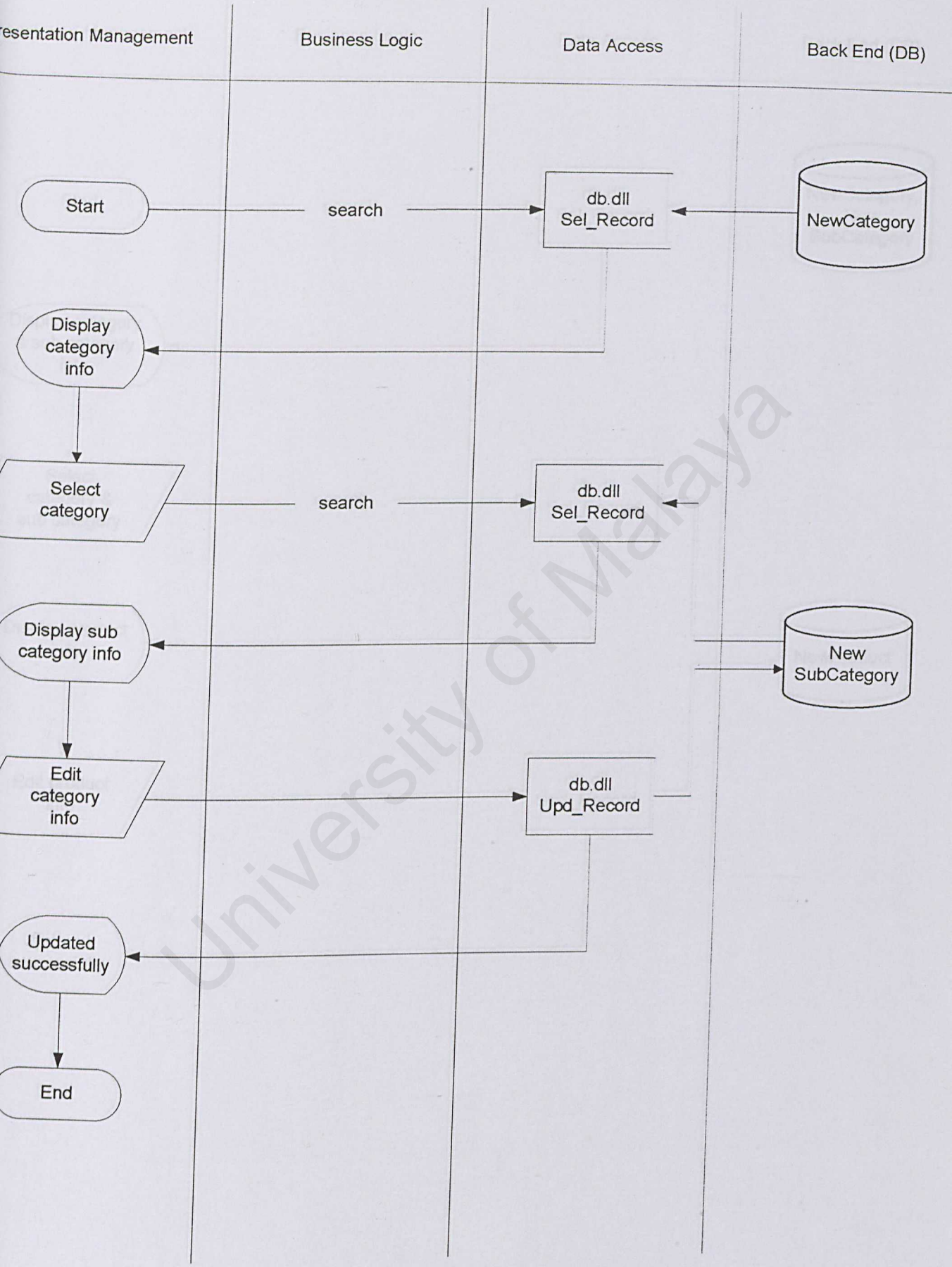

Figure 16 Edit Sub-Category

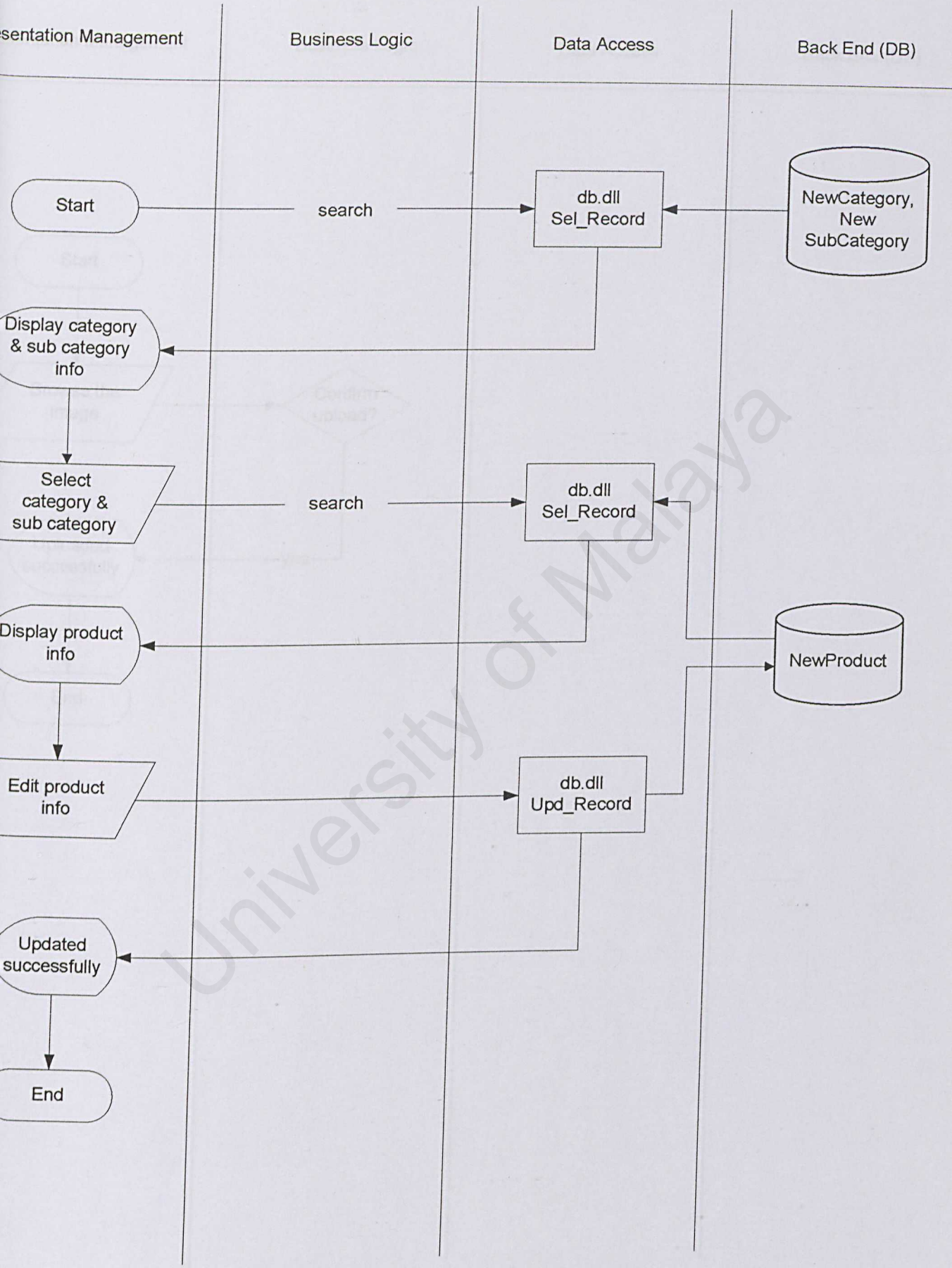

Figure 17 Edit Product

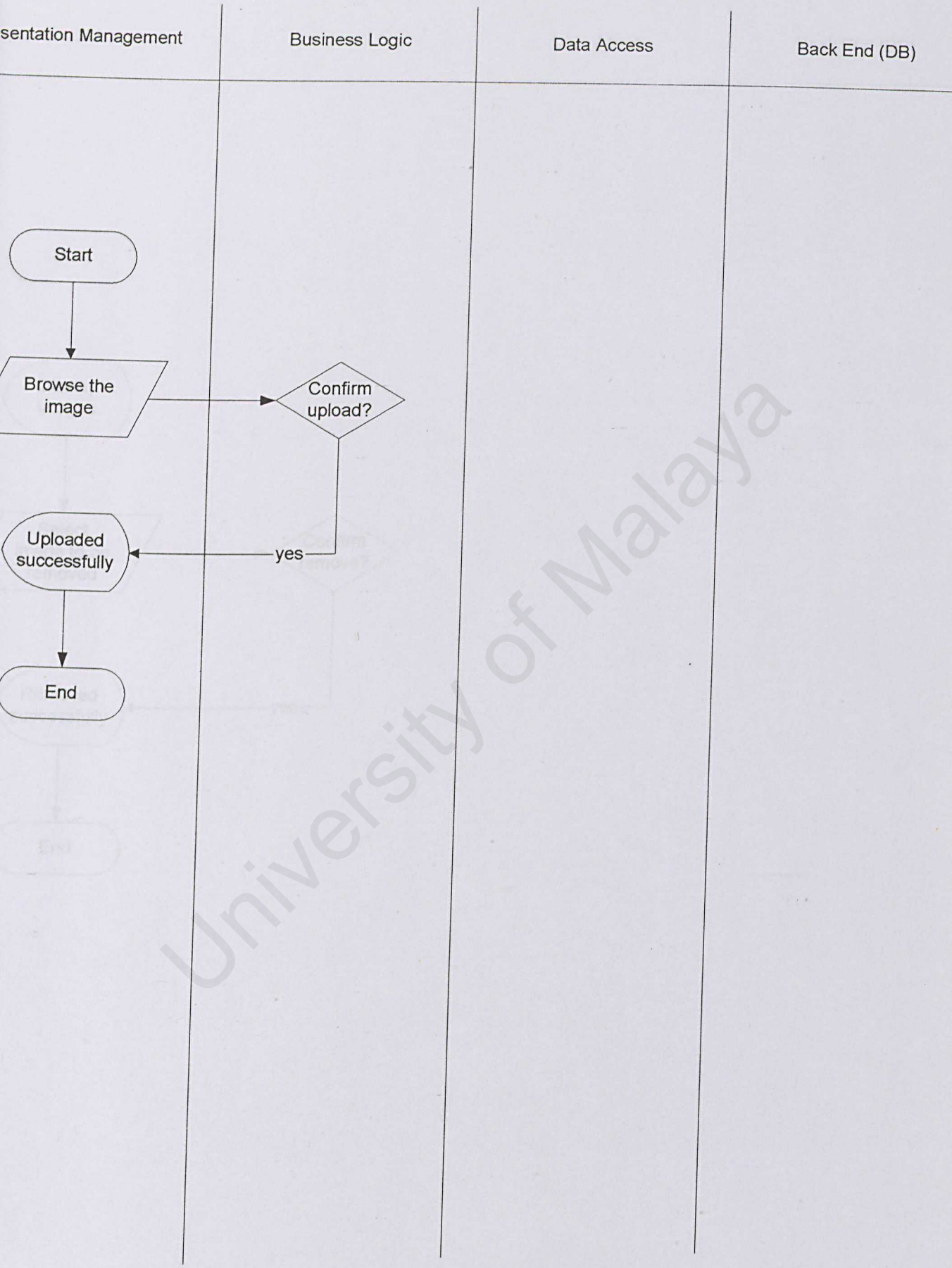

Figure 18 Upload Image

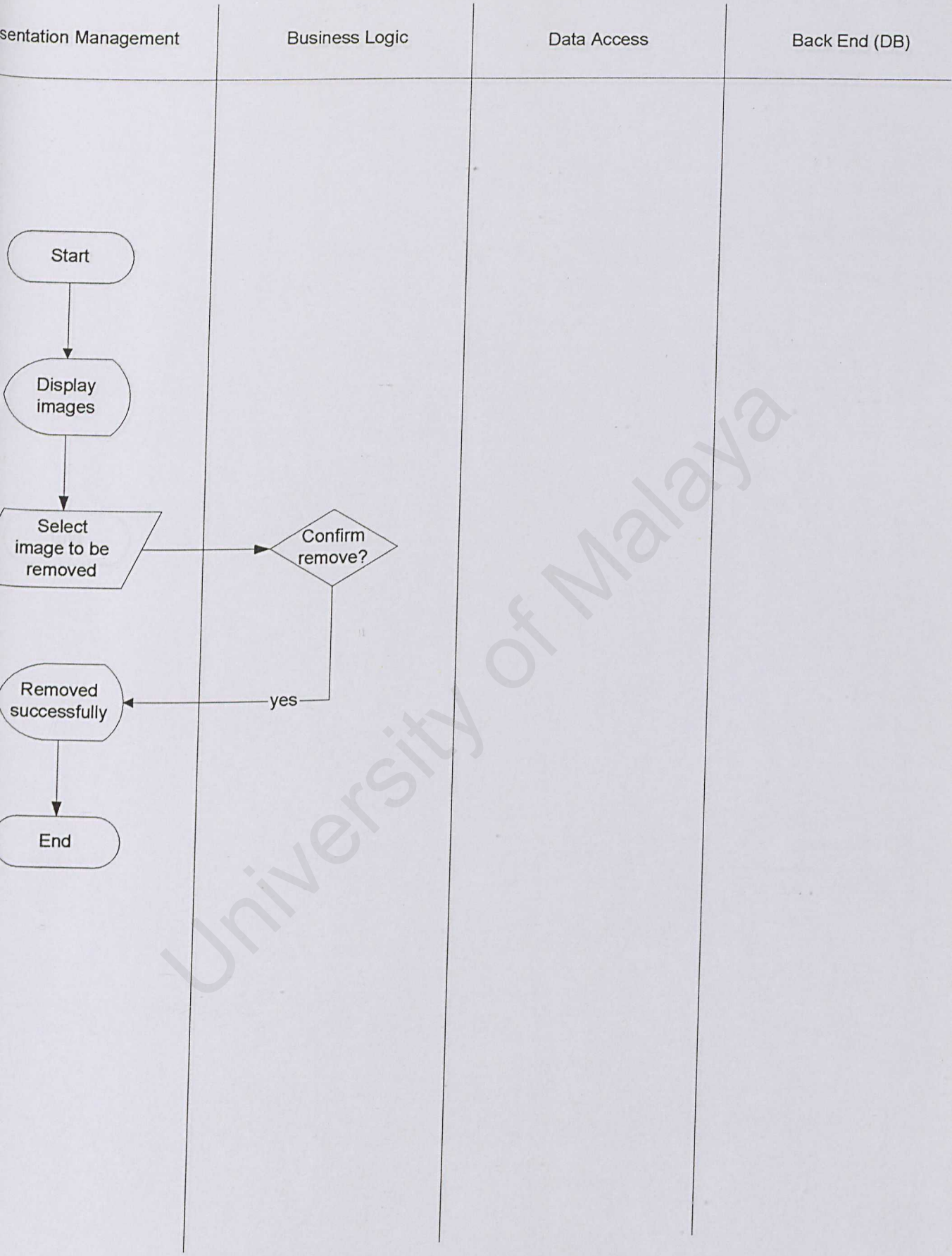

Figure 19 Remove Image

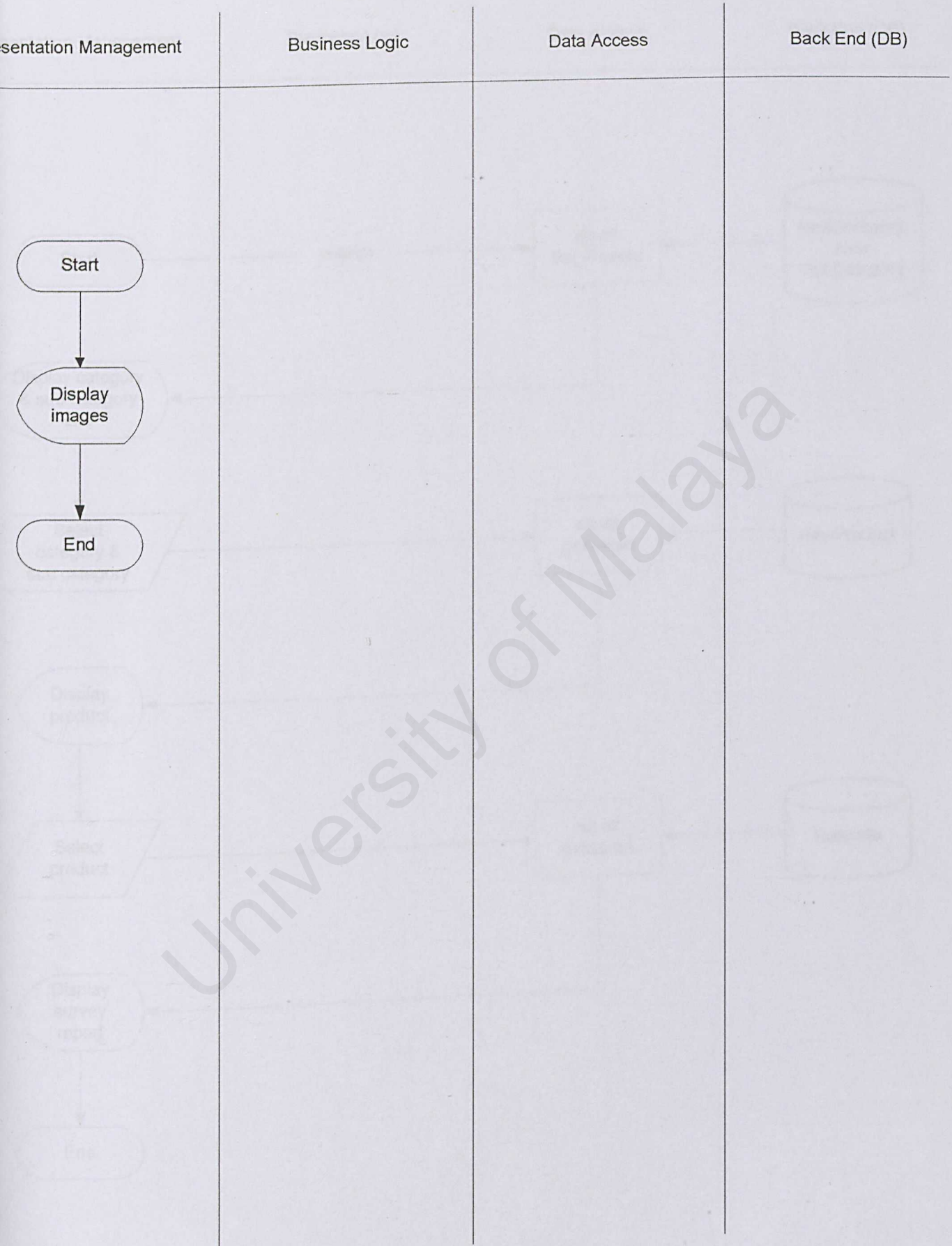

Figure 20 View Image

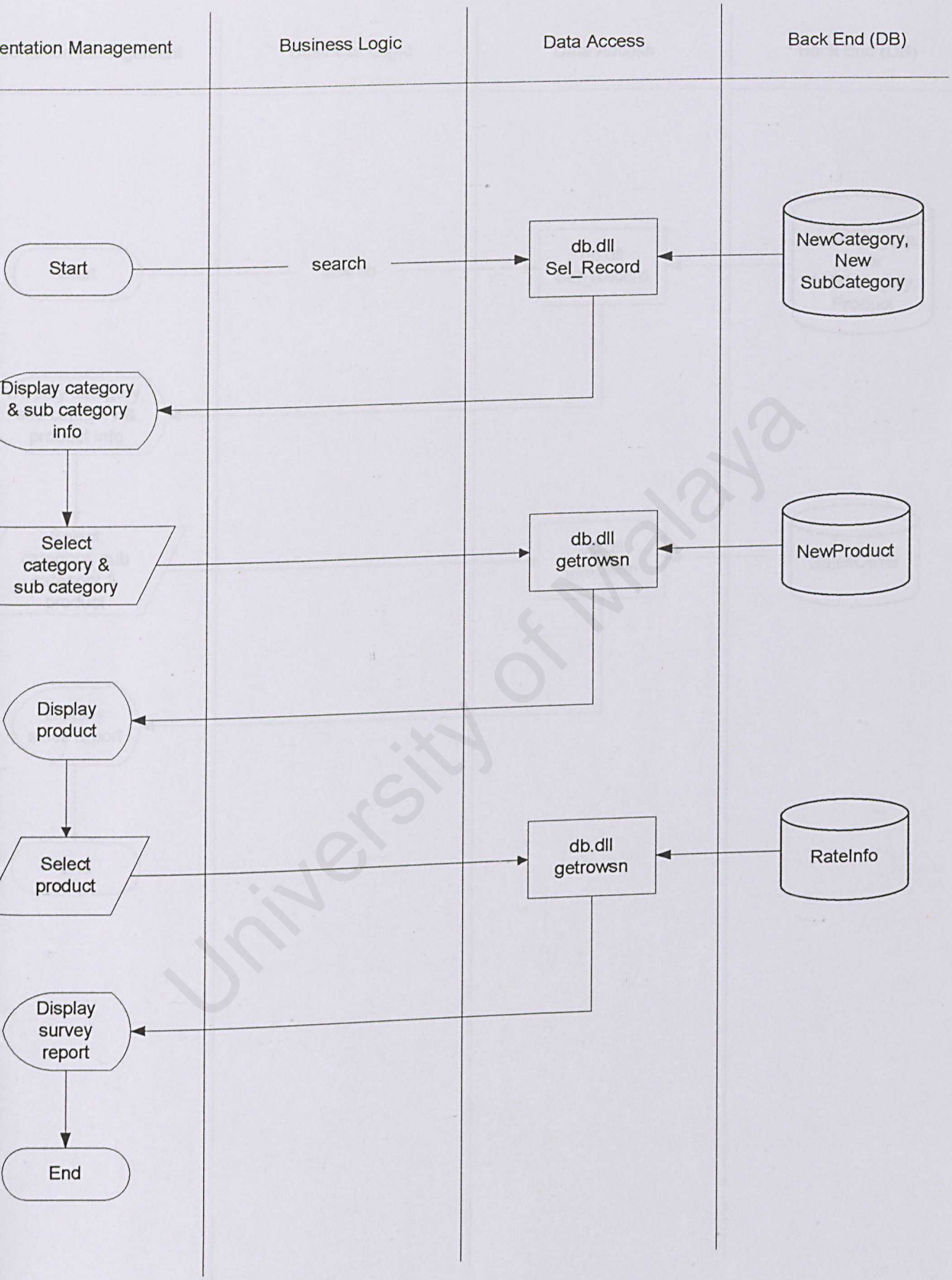

Figure 21 Survey Report

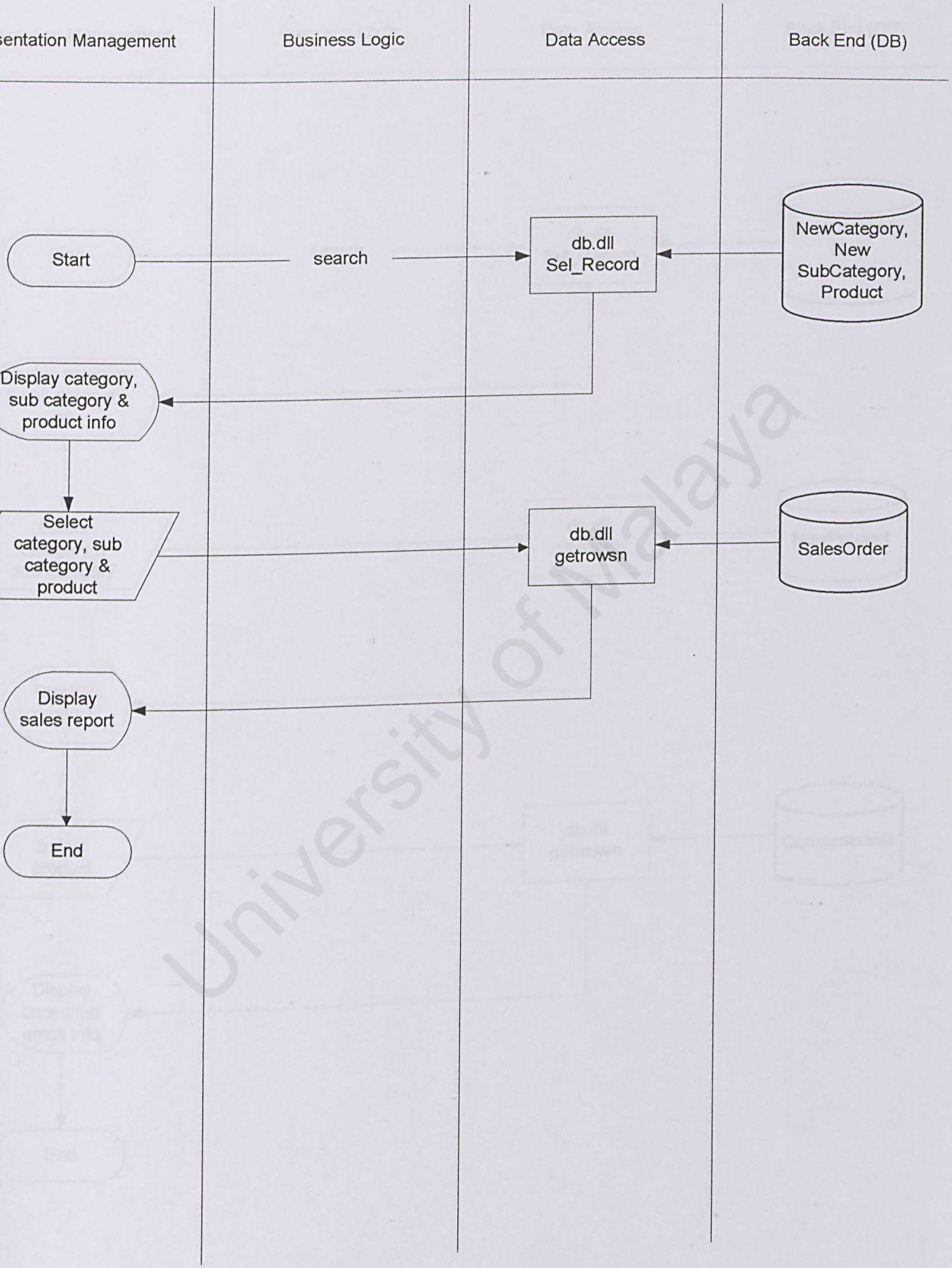

Figure 22 Sales Report

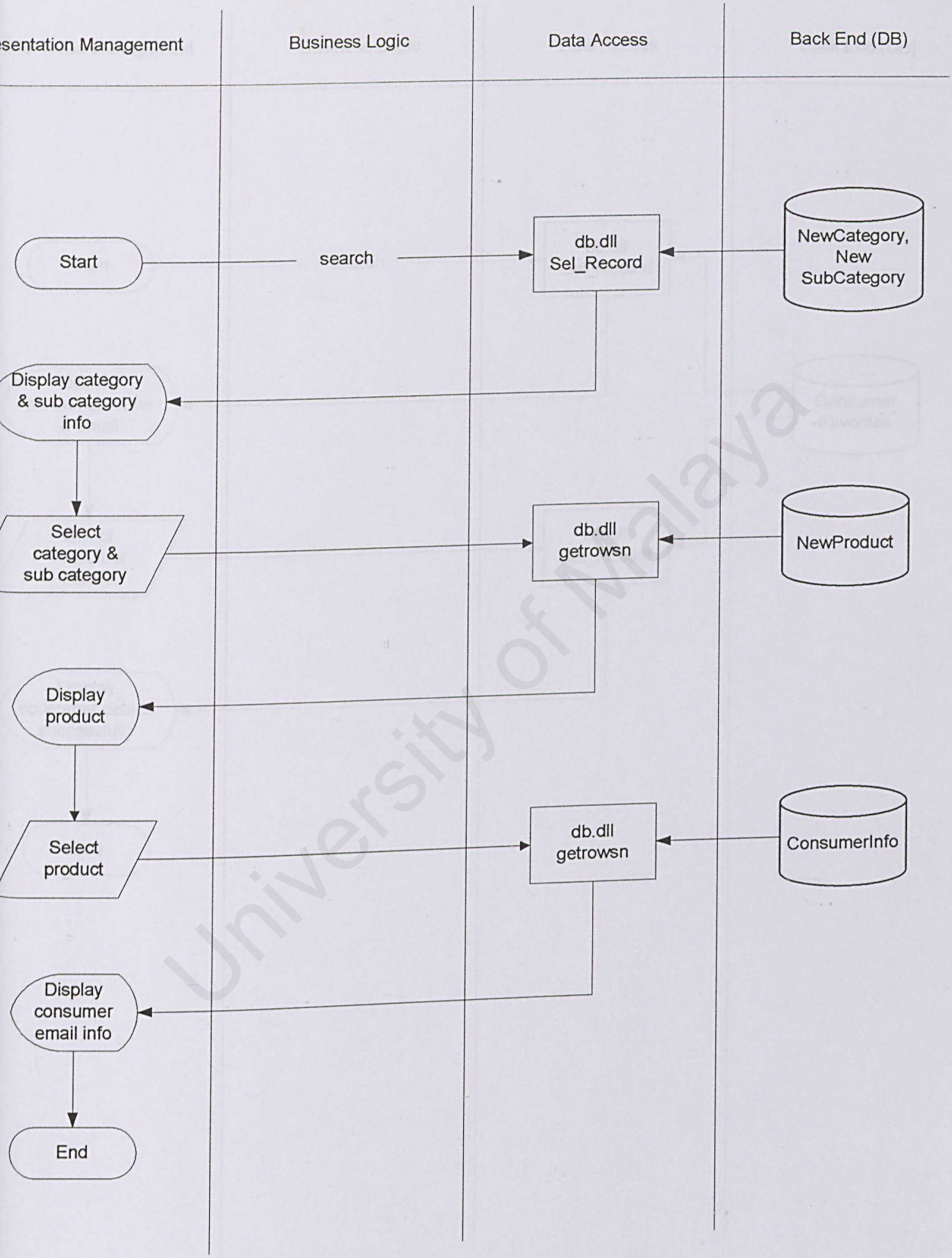

Figure 23 Email Information